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PROFILE

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The Martin B-57 Night Intruders & General Dynamics RB-57F

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by David A. Anderton, B of AeE, AFAIAA

In early 1954, the Martin B-57 assembly area in Plant 2 was crammed with aircraft; about 20 are shown here in final assembly, plus a large number of fuselages in jigs to the left. Aircraft 5, B-57A (52–1422) is at the forward position on the line to the left; the aircraft under tow is presumed to be B-57A No 4.
(Photo: Martin, ref. P-50228)

The Martin B-57 Night Intruders & General Dynamics RB-57F

by David A. Anderton, B of AeE, AFAIAA

The Martin B-57 was born out of one war, grew to fill a requirement spawned by a second war, and lived to fight in a third.

It began as the British-conceived English Electric Canberra jet bomber,[1] developed from design requirements that had originated in the latter days of World War Two. The characteristics that made the Canberra a superb high-altitude bomber gave it amazing manœuvrability in low-level flight. That, coupled with its internal volume, led to its selection to fill a Korean war requirement for an 'off-the-shelf' replacement for the Douglas B-26, with a design mission of night interdiction.

The Korean war faded into memory, and hundreds of B-57s in their seven models were built, flown, crashed, scrapped and modified. And then came the conflict in Viet Nam and the final days of glory for the old war horse. There and then it was used to do the night interdiction job it had been chosen for almost two decades earlier.

The Martin B-57 Night Intruder—for that was and is its official name—has been respectfully called the 'gooney bird of the jet fleet' by one pilot who spent more than 4,700 hours flying various models of the B-57. What he meant was that the B-57—like the Douglas C-47 'gooney bird'—was a versatile aircraft that could be modified to do almost any job well. The Air Force Logistics Command has said that the B-57 has been modified to more effective configurations than any other USAF aircraft in the inventory.

'It will be around in some shape or form for some time,' the pilot said, 'And I hope you can get others to appreciate it as much as the guys did who flew the B-57.'

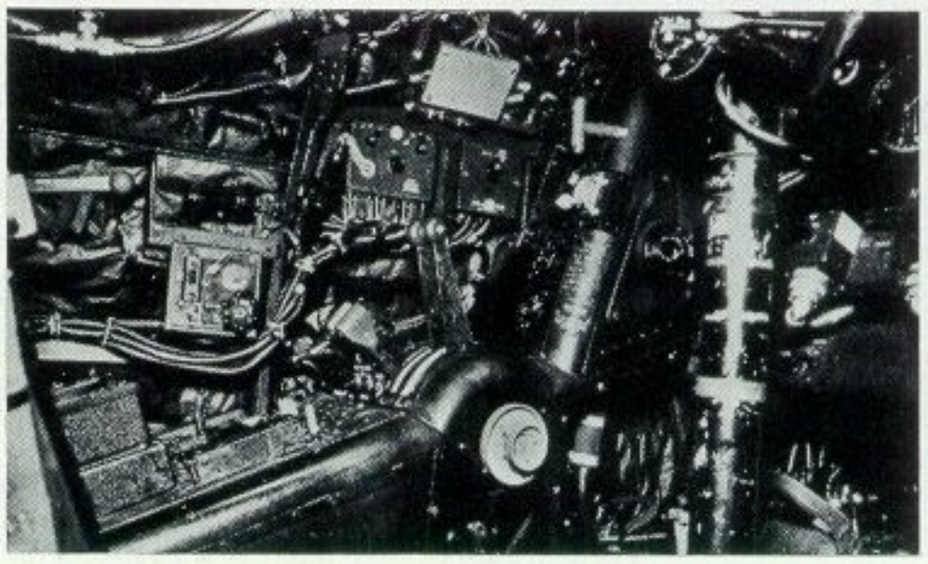
This is an attempt to do just that.

[1] Aircraft Profile No 54: Canberra Mks. 1–4

Requirement for the B-57

'I believe that the paramount deficiency of the USAF today . . . is our inability to effectively seek out and destroy the enemy at night.' When Lieutenant General Earle E. Partridge, USAF, said that in April 1951, he was speaking from the bitter experiences of his Fifth Air Force in night operations in Korea. Only one available unit—the 731st Bombardment Squadron (Light-Night Attack)—had been trained for the job. They were equipped with the ageing Douglas B-26 (born A-26 Invader in World War Two).

But there were never enough trained crews or B-26s available, and repeated requests to Headquarters brought only partial satisfaction. Finally the experience and requests materialized



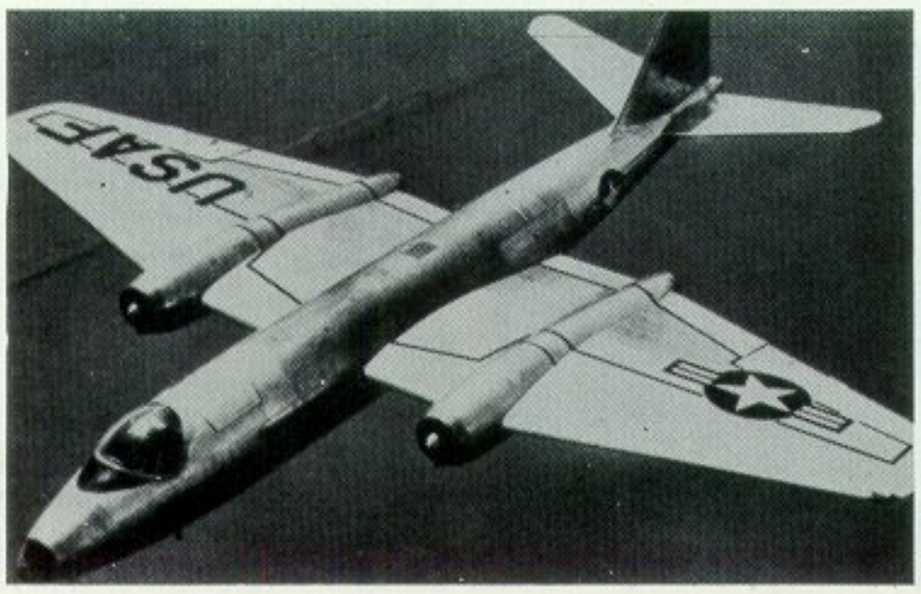
Contrasts in cockpits are shown by this pair of photos of the left side of the Martin B-57A and the English Electric Canberra B.2. Part of the Canberra clutter may be attributed to the fact that it was early in production for that particular mark. But the layout and colour contrasts in the US aircraft cockpit show a remarkable improvement in cockpit accommodations, and indicate the result of considering human engineering principles in the redesigned layout.
(Photo: Martin via Air Force Museum)

The eleventh RB-57A (52–1428) flies low over the Kansas countryside near Forbes AFB. Now in storage at MASDC, 1428 served with the 4677th DSES, Hill AFB, and the Kansas ANG, based at both Forbes and Hutchinson AFB.
(Photo: KanANG via Sgt. Ron Loewen)

in the form of a requirement for a new 'night intruder' aircraft, intended to be a replacement for the B-26, 'off-the-shelf' because time was so short and the need so urgent.

Colonel Frank Allen, USAF, worked on the requirements and was a member of the group of senior USAF officers who evaluated and tested five airplanes for the job. They narrowed the available contenders down to the Martin XB–51, a tri-jet bomber which had been flying for more than a year; the North American B-45 Tornado four-jet bomber and AJ-1 Savage two-motor carrier attack aircraft; the Avro Canada CF-100 Canuck twin-jet fighter; and the English Electric Canberra.

Allen wrote later that the most serious deficiency then was the lack of poor-weather and night sensors and weapon-release systems. The Board concluded that only the Canberra had the available volume to accommodate those sensors and systems when they became available, and selected the Canberra as the B-26 replacement.



It received the designation of B-57 Night Intruder and arrangements were made to fly two pattern aircraft over from England for use by the Glenn L. Martin Co., chosen to build the B-57.

The first of the pattern aircraft was also the fourth production B.2 (Royal Air Force serial no. WD932). Loaned to the USAF from February 20 1951, it was flown the following day from Aldergrove, Northern Ireland, to Gander, Newfoundland, a distance of 2,060 miles, in four hours and 40 minutes. On February 24 it continued to Andrews Air Force Base, near Washington, DC, and a few days later was flown by R. P. Beamont, English Electric's Chief Test Pilot, in a competitive demonstration against the Martin XB-51.

On March 5, WD932 was handed over to Martin and used by the company for performance verification, evaluation and test work. It was transferred to USAF ownership after several months, and assigned the United States Air Force serial number (Fiscal Year 1951) 51–17387. In the event, the aircraft was never so marked.

Nine months later, on December 21, WD932 disintegrated in a tight turn at 10,000 ft. and crashed. The pilot escaped, but the second crew member was killed when his parachute failed to open. Investigators concluded the crash was caused by flying the aircraft with its centre-of-gravity aft of its prescribed limit. In a tight turn, this unstable configuration wound up into a tighter and tighter turn with rapidly increasing loads until the port wing failed near the nacelle.

Second of the pattern aircraft was WD940, which was the 12th production Mk. 2. On August 31 1951, it was flown from Aldergrove to Gander by an English Electric crew headed by Beamont, setting an official record time of four hours and 18 minutes, for an average speed of 481.1 mph.

This Canberra was handed over to Martin on September 4 and about one year later was marked with US insignia and the serial no. 51–17351. It retained the RAF colour scheme of light grey upper surfaces and black under surfaces.

Used in flight testing of proposed features of the B-57—including underwing pylons for weapons—WD940 was later modified to test the

The first Martin B-57A (52–1418), in the bare metal finish characteristic of early production aircraft, cruises on a test flight near the company's Middle River, Maryland, plant. Aircraft made its first flight July 20 1953. It was later assigned to the Lewis Research Center of NASA at Cleveland, Ohio, as a testbed aircraft.
(Photo: Martin)

'Blackbird' RB-57A (52–1470), the 53rd production aircraft, in gloss black finish standardized for the night intruder mission. Markings and codes are in gloss red. Aircraft was lost later, sometime before 1957, for unexplained reasons.
(Photo: Martin via N. E. Taylor)

RB-57A (52–1427), the tenth production aircraft, is shown in September 1961 in the colourful markings of the Arkansas Air National Guard. The aircraft had earlier been assigned to duty on Taiwan; in 1963 it was designated to to be rebuilt as RB-57F (63–13300) and currently is on active duty at Yokota Air Base, Japan, with Detachment 3 of the 9th Weather Reconnaissance Wing.
(Photo: Duane Kasulka)

EB-57A (52–1464) waiting final disposition in storage at MASDC, Davis-Monthan AFB. The 47th production aircraft, it served with the Arkansas ANG during the early 1960s and with the Aerospace Defense Command in the late 1960s, operating out of Holloman AFB, NM.
(Photo: Ben Knowles)

new canopy design for the tandem seating arrangement that was introduced with the B-57B model.

B.2 and B-57A Differences

Comparing the Canberra B.2 and the B-57A would reveal no outward changes at first glance. But closer scrutiny would turn up more than a dozen fundamental differences between the two types of aircraft.

The US mission was different, calling for the ability to hit moving targets at night. That meant manœuvrability at low altitudes, range to strike at distant targets, and endurance to loiter in the target area.

The RAF's three-man crew was reduced to two in the USAF version. In the B-57A, it was a pilot and a navigator, but later models would have a second pilot, an electronic warfare officer, or an observer.

The unarmed Canberra became the 'gun-toting' B-57 with the addition of forward-firing guns installed in the wings outboard of the nacelles. Fire-control systems and gunsights were installed, and the wings were fitted with hardpoints for external weapons.

The Canberra cockpit was, at that stage of development, most kindly described as cluttered. The USAF specified a complete cockpit redesign with improved, standardized lighting. The B-57 cockpit was air-conditioned. Toe brakes were fitted to the rudder pedals, replacing the hand brakes of the B.2.

The engines were changed from Avons to licence-built Armstrong Siddeley Sapphires, built by Buick Motors for early aircraft and later by the Wright Aeronautical Corp., the original licensee. Because the USAF used JP-3 and later JP-4 jet fuel instead of kerosene, the fuel system had to be altered upstream of the engine. The hydraulic system was standardized as a 3,000 lb/sq. in. system, necessitating complete redesign. The hydraulic pump and the engine-driven generator were mounted directly on the B-57's engines; in the B.2 they had been mounted in the wing stub and driven by an extension shaft.

A major improvement was the development and installation of the Martin rotary bomb door. This design idea, patented by Martin engineers Werner Buchal and Albert T. Woollens (US Patent 2,634,656), used a pre-loaded bomb door which rotated instead of hinging open. Fully rotated, the door sealed what would normally be an open bomb-bay, which often subjected the aircraft to buffeting and the bombs to extraneous aerodynamic forces before and during drop.

In addition to its performance advantage, the rotary bomb door can be pre-loaded at a remote site, and then towed to the aircraft for installation. Different weapon arrays can be pre-loaded, to minimize the turnaround time between sorties and to give the maximum flexibility in mission planning.

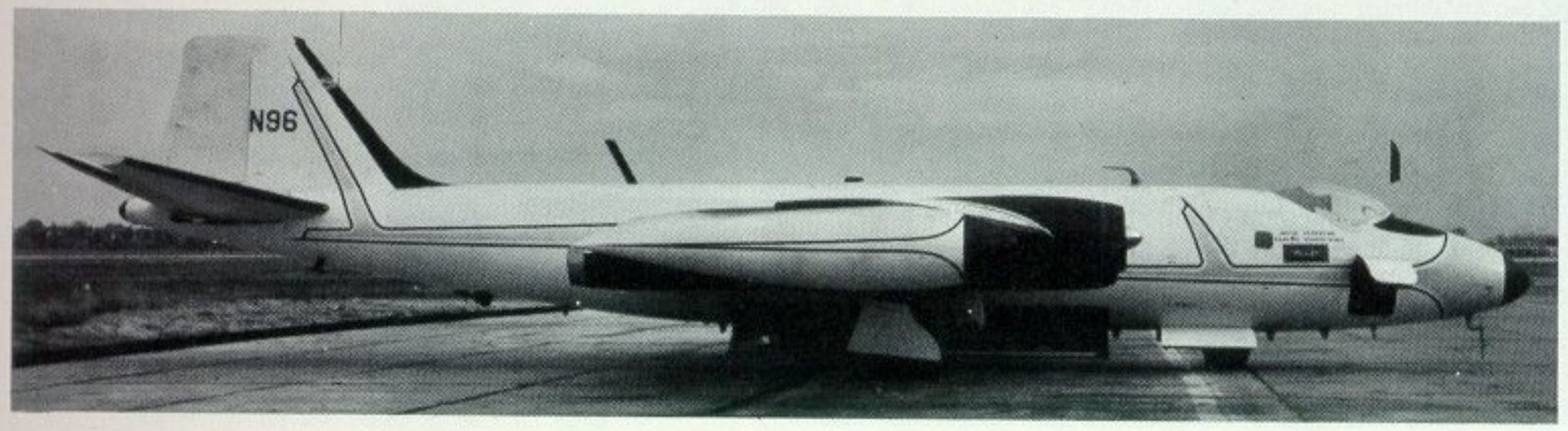
The Martin engineers developed the door for their Model 234 which became the Air Force XB-51. It was designed in two forms, one for extremely large bombs, which bulged the belly contour of the B-57, and the second for all other types of bombs. Rockets could also be carried on the door. In later models, cameras, tow-target winches, electronics countermeasures equipment, and other armament were carried on the rotary doors.

Finally, the doors themselves had external strong points to hold two additional stores, but as far as can be determined, this feature never was routinely used operationally in the B-57.

B-57A Description

The B-57A retained Canberra characteristics and geometry. Its wing area was 960 sq. ft.; and the aspect ratio a low 4.27. RAE (Royal Aircraft Establishment) aerofoil sections were used at the root (12%) and tip (9%).

Power was provided by two Sapphire turbojets, redesignated J65-BW-5, or J65-W-5, depending on whether they were built by Buick or Wright. Early B-57s had the Buick engines; later



RB-57A (probably 52–1438) operated by the then US CAA (Civil Aeronautics Authority) for high-altitude flight inspection. Aircraft was finished in white, with Day-glo red blaze outlines in black.
(Photo: via G. S. Williams)

production was entirely Wright-powered. The J65 was rated at 7,220 lb thrust at sea level, military and maximum power.

Fuel was carried internally in fuselage and wing tanks, and externally in wingtip droppable tanks. Total capacity was 2,892 US gallons.

Armament was 8×.50-cal. (0.50-in.) M-3 machine-guns, each with 300 rounds of ammunition.

The RB-57A was essentially the same aircraft equipped for reconnaissance. Later, some RB-57A aircraft were modified for electronic warfare missions, and redesignated EB-57A. They carried a bomb-bay full of ECM equipment; the bomb door naturally was inoperative when the aircraft was airborne.

Weapons Delivery

Bomb release was done either by manually dropping on known coordinates, or automatically by the Shoran computer. Either the pilot or the navigator could release the bombs, but the pilot had to select the specific weapon and release sequence.

The rotary bomb door is actuated just before bomb drop. It opens in four seconds and closes in six. The door is loaded in three bays, each with seven bomb stations mounting S-2 bomb racks. There are two alternate bomb racks between the middle and rear bays for larger stores, and there is also a second-layer suspension system when smaller bombs are carried.

Typical bomb loads include 52- and 80-lb. flares, and 220- and 260-lb. fragmentation bombs, which can be loaded at all 21 stations. Nine are used to carry either the 500-lb. general-purpose (GP) or the 500-lb. fragmentation bomb; the 500-lb. intermediate bomb is loaded on five of the stations. Heavy weapons—a 750-lb. store and a 1,000-lb. GP—are carried at four stations only.

There is no airspeed limit on operation of the bomb door, but some stores—such as the box-finned 500-lb. GP bomb—do carry jettison speed limits.

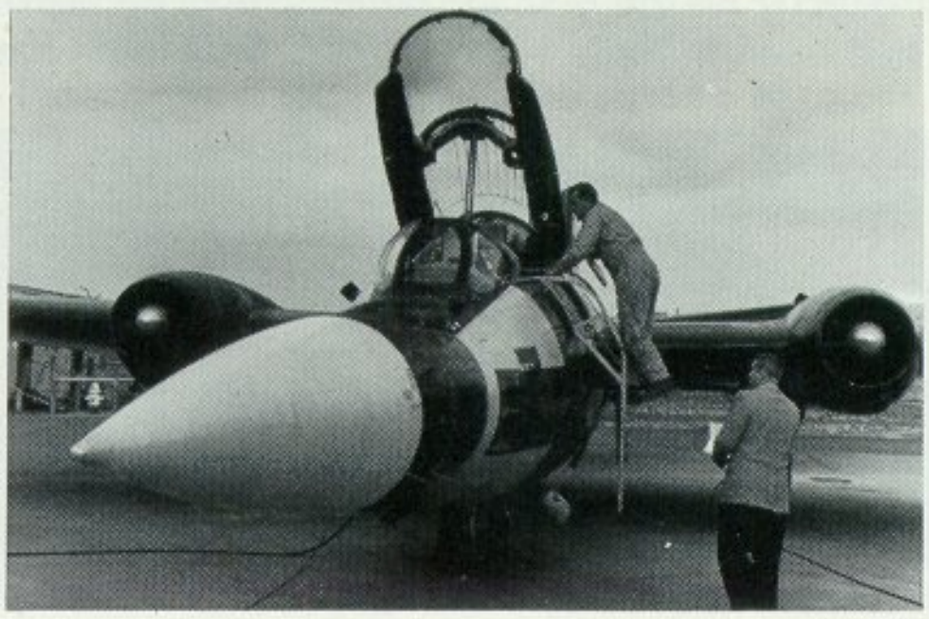
Performance

Early US press reports said that careful aerodynamic overhaul of the B-57 had given it a major increment in top speed compared to the

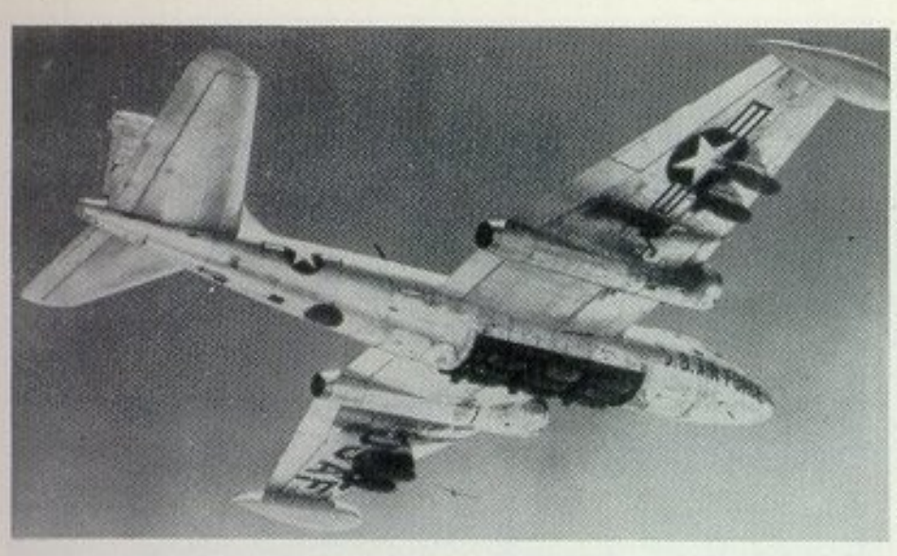
EB-57A (52–1461) banks to reveal a bomb bay full of ECM equipment. Note the large number of external antennas, and the podded chaff dispensers. This aircraft served with the Arkansas ANG before going to Aerospace Defense Command for ECM missions; it is now in storage at MASDC.
(Photo: USAF)

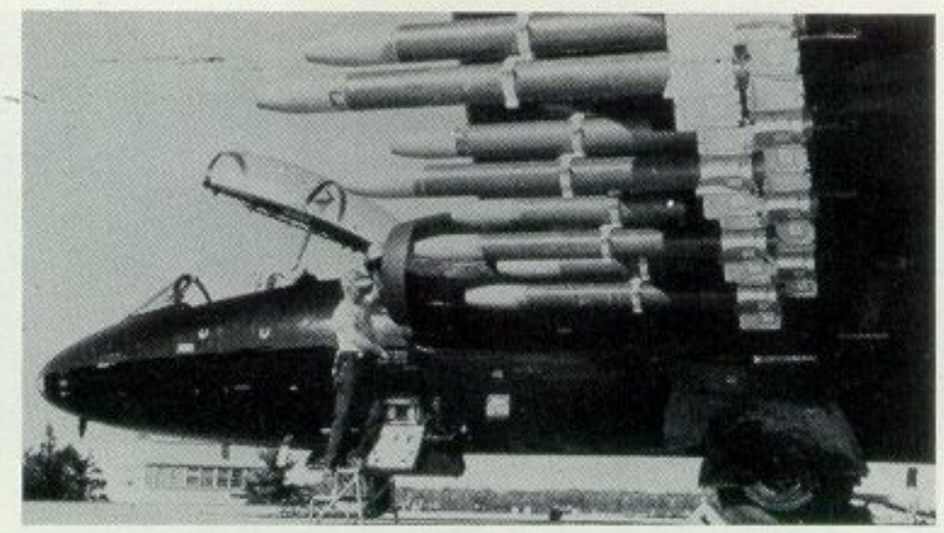
Four 500-lb. general-purpose bombs on wing pylons, plus an internal weapons load, arm this B-57B taking off on a sortie against Viet Cong forces in central Viet Nam.
(Photo: USAF 94690)

This JB-57B (52–1540) was one of several used for support missions at the Air Force Missile Test Center during the early 1960s. Specific test missions included calibration of missile tracking-camera lenses, done by photography of the test pattern on the forward fuselage.
(Photo: Jimm Dorrance via Aardvark Art)



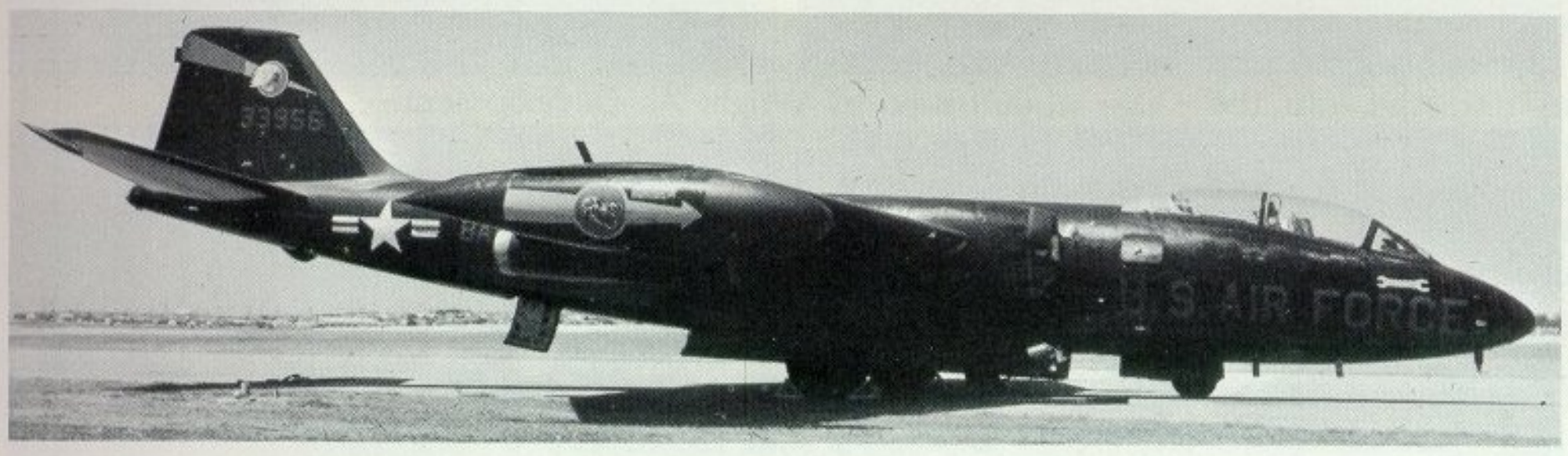
B-57B (probably 51–1497) with Bomarc missile nose, modified by Temco Aircraft Corp. in 1956 for flight tests of guidance systems. Aircraft was subsequently flight-tested by Temco, Boeing—as shown in the photo—and the Air Force. Changes included separate missile electrical, hydraulic, cooling and pressurizing systems, and strengthened primary structure.
(Photo: via G. S. Williams)





Ready to drop, this B-57B carries nine 500-lb. bombs on its rotary bomb door plus four more on underwing pylons. Smoke stains on underwing are from gunfire. Dark circular area below US insignia on rear fuselage is Shoran antenna.
(Photo: USAF 98346)

Air-to-ground rockets were part of the underwing armament carried by Martin B-57B aircraft.
(Photo: Martin Co.)



This immaculate B-57B (53–3956), one of the last B models built, carries the markings of the 499th Bombing Squadron (Bats Outa' Hell) on its wingtip tanks and the crest of its parent 345th Bomb Wing (Air Apaches) on its fin. This aircraft later was sent to the Pakistan Air Force under the US Military Assistance Program. Marking on the nose depicts a standard mechanic's open-end wrench, and carries the crew-chief's name.
(Photo: Warren Shipp via Gordon S. Williams)

Canberra. This was supposed to have been largely the result of gap-sealing between fixed and movable surfaces. As much as a 30-kt. speed differential was reported, corresponding to nearly 1/10th of a Mach number at altitude.

In fact, all the work done on sealing by Martin produced at the most a five-kt. gain in true airspeed. The quoted higher figures later were found to have been due solely to position error in the airspeed indicator system. English Electric had found that the static vent position on the Canberra was critical and needed close production control to maintain accuracies.

Some miscellaneous pilots' notes on the B-57A will characterize that aircraft, and the behaviour of the other similar models—B, C and E—in the fleet.

Both the B-57 and the Canberra are noted for good handling qualities at low speed. The controls are effective down to the stall, and there is good response to control deflections. They have extremely safe stall characteristics.

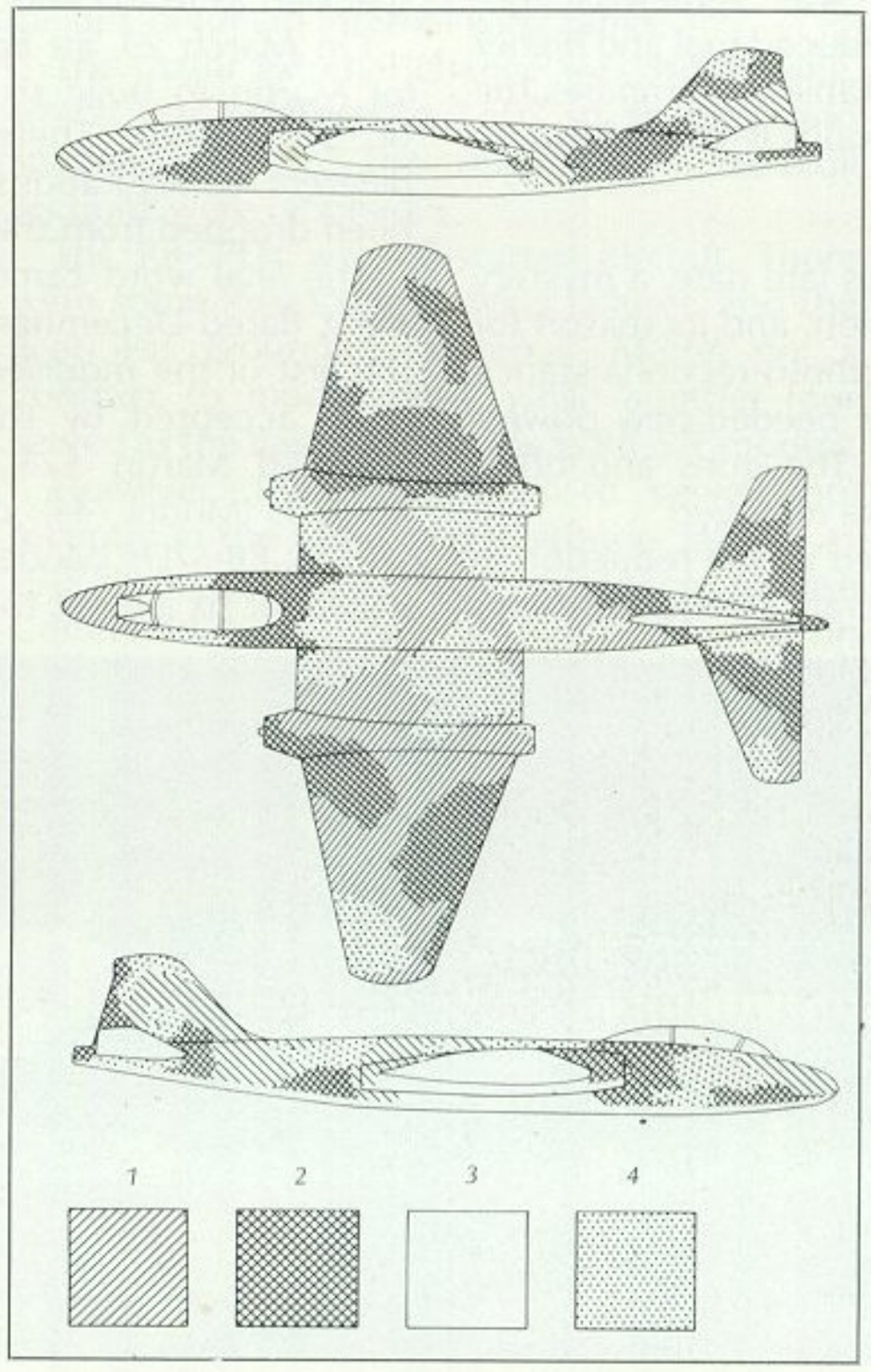
Stalling speeds for B-57s varied from a maximum of about 130 kt. (at 53,400 lb., take-off configuration, landing gear down and zero flap deflection) to a minimum of 85 kt. (at 28,000 lb., landing configuration, landing gear down and 60° flap deflection).

There was a slight tendency to tuck at Mach 0.88, and sharp pitch-up could occur around Mach 0.87. A modification in the longitudinal control system on all B-57 aircraft made it easier to pull 'g'; the elevator forces were decreased at all weights and centre-of-gravity (c.g.) positions. The B-57A, according to the pilots' notes, was normally operated close to the aft c.g. limit, approaching the neutral point, so there was little feel in the elevator controls. The pilots were cautioned that they could apply destructive load factors with no effort, and that the airplane then would become unmanageable.

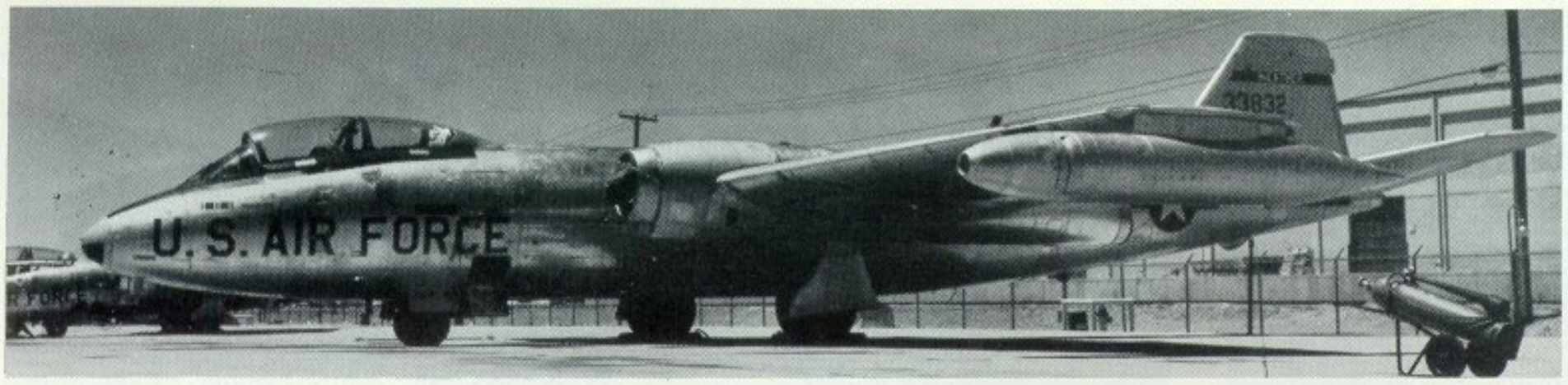
With wingtip tanks 'on', the B-57A had a never-exceed speed of 444 kt. indicated; tanks 'off', the speed limit was 513 kt.

B-57B, C and E Descriptions

These three models were sisters under the skin, and almost identical triplets. They all used the same basic airframe, which had been modified from the earlier B-57A and RB-57A design to use tandem seating. Pilot and second crewman were enclosed in a pressurized cockpit under a



B-57 Aircraft camouflage pattern
1. Green No. 34079
2. Green No. 34102
3. Grey No. 36622
4. Tan No. 30219



Wingtip pods for capture of airborne debris from nuclear weapons tests are carried by this RB-57C (53–3832) of the Air Weather Service photographed in May 1965. Pods have removable paper filter elements, were developed by the Los Alamos Scientific Laboratory. Aircraft is now designated WB-57C and was still assigned to the 58th WRSq in April 1972.
(Photo: via Gordon S. Williams)

clamshell canopy. Additional changes included a second set of speed brakes, triangular in shape and mounted on the aft fuselage, augmenting the finger type of brakes retracted into the upper and lower wing surfaces.

The J65 engines were retained, and the fuel capacity remained a total of 2,892 gallons. An additional 548 gallons could be carried on the bomb door in ferry tanks.

The basic differences between the models were the inclusion of dual controls on the B-57C for training missions, and removable tow-target installations on the B-57E for that mission. The C could be converted quickly to the B configuration, and the E could be converted to either the B or C model.

Armament on the B-57B was initially 8 ×.50-cal. machine-guns. On the 91st and all subsequent aircraft, they were replaced by four 20-mm. M-39 cannon, each with 290 rounds.

External pylons under the wing outer panels gave the B-57B and C much additional weaponry to load, including the cluster stores developed during the mid-1950s.

Combat performance was somewhat decreased because of the reduced fuel and higher weights of later models (Table VI compares the design missions of the various B-57 models).

RB-57D Description

The RB-57D is, even at this late date, a mystery aircraft. Its principal mission, and its reason for being, was high-altitude photo-reconnaissance in daylight. To do that, it needed new powerplants and larger wings. The guns and other armament provisions were removed.

The D models originated with a reduction in the contract for B-57B aircraft. Twenty airframes in two batches—one of 13 and the other of seven—were earmarked for separate use under a different contract. That use came from a design study issued by Wright Air Development Center in June 1953.

Martin received a letter contract dated June 29 1953 for a design study, and subsequent contracts and amendments over the next five years, covering the design, development, construction, testing and support of what were to become the RB-57D aircraft.

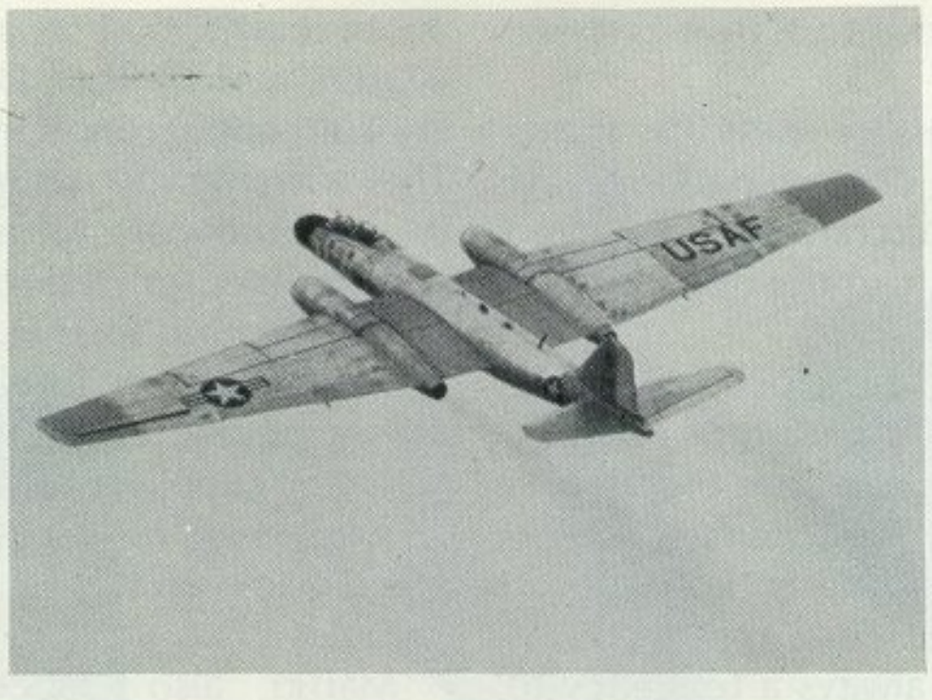
Preliminary engineering established the first D configuration, designated as Model 294 by Martin. At the same time, Martin engineers were studying the best equipment for radar photography, simultaneous day and radar photography, and electronic ferret missions.

On February 4 1955, Martin received a letter contract to build 14 B-57Ds. One B-57D would be built according to Contractor's Model 796; seven to Model 744; and six to Model 797. Note that Model 294 is not mentioned in this contract, that three new Contractor Model numbers are introduced, and that the aircraft were specified as B-57D and not RB-57D.

On March 29, an approved contract called for Martin to build six B-57Ds at a total cost of $18,825,780. There was no mention of different configurations, and eight aircraft had been dropped from this contract.

The final word came in an approved document dated December 21 1955, by which time the first of the modified aircraft had flown and been accepted by the USAF. That contract awarded Martin $24,795,640 to build seven RB-57Ds (Model 744); one RB-57D (Model 796); and six RB-57Ds (Model 797). The contract also called for six aircraft to be changed from B-57D

The unusual markings on this RB-57D at Wright-Patterson AFB were done to test the quality of lenses and film emulsions in Project APRE (Aerospace Photographic Reconnaissance Experiments). Neutral grey area on left horizontal tail is photographic standard for color reproduction. A dozen convex mirrors are positioned on fuselage and wing upper surfaces. Aircraft was flown below a balloon carrying the camera on test, and photographed as it passed within the camera's field of view.
(Photo: USAF)



This photographic study of B-57D (53–3965) was taken at Otis AFB, Mass., where the aircraft was on the strength of the 4677th DSES. Originally one of the six RB-57D-2 models, 3965 was placed in storage at MASDC where it currently waits its final disposition.
(Photo: Picciani Aircraft Slides)

Climbing out, uses its spoilers (near left wingtip, the deflected surface is thrown into relief by the shadow area) to bank into the left-hand pattern around the field. Then, using both spoilers for flight-path drag control, the aircraft comes in . . .

over the fence, with gear down and locked. This rare sequence of a D model in flight was photographed by Ron Picciani.
(Photos: Picciani Aircraft Slides)

to RB-57D models. The total was 20 aircraft, the number eventually built.

In the same contract there was an item for six airborne semi-automatic 'ferret' equipment systems, presumably intended either for the ex-B-57D aircraft, or the six built to Model 797 specifications.

By the time the bills were all added up, these 20 aircraft cost more than $60 million. The first RB-57D flew in November 1955 and was accepted that same month. The last was accepted in March 1957. The first official mention of the RB-57D identified it as a high-altitude testbed for the J57 engines, and thus skirted mention of its true role.

There were four production batches of RB-57D models. The first six to be built, presumed to be of the original Model 294 configuration, carried the serial Nos 53–3977 through 53–3982. They were designated RB-57D, and carried a one-man crew.

Serial numbers 53–3970 through 53–3976—the 7th through 13th airframes—were also designated RB-57D. They carried a one-man crew also, but had aerial refuelling systems. These are presumed to be the Model 744 aircraft.

Serial No 53–3963—the 14th airframe—was the only one of its kind. Designated RB-57D–1, it carried a one-man crew and had aerial refuelling. This was Model 796.

Serial numbers 53–3964 through 53–3969 were the 15th through 20th airframes built, and were designated RB-57D-2. They carried two-man crews and had aerial refuelling. These are presumed to have been Martin Model 797.

All the D aircraft were powered by two Pratt & Whitney J57-P-27 turbojets, each rated at 10,500 lb t. at sea level. They carried 2,740 gallons of fuel in internal wing tanks.

The major external change was in the wing, which was enlarged to 1,505 sq. ft. area, and spanned 106 ft. The original RAE aerofoil sections were retained.

The RB-57Ds were ill-starred aircraft. There were some losses due to wing failures, and the fleet was grounded for repair. Martin got a contract to modify nine; while another four served as the basis for rebuilds as RB-57F models.

However, they continued to serve until recently in the role of high-altitude 'fakers', as EB-57D aircraft of the USAF Aerospace Defense Command. Nine—the ones modified by Martin—were assigned to the 4677th Defense Systems Evaluation Squadron at Hill AFB, Utah.

By then, USAF pilots had learned a lot more about flying these high-altitude, over-powered gliders. They learned that take-off was made at less than full throttle, because the rudder could not handle an engine-out situation. The RB-57D would roll for less than 2,000 ft. on the runway and become airborne at 106 kt. The initial climb angle was 25° and they seldom took more than 15 minutes to attain 50,000 ft. from brake release.

Airframe limitations kept the speeds down below 190 kt. indicated. So the RB-57D was flown in climb, cruise and letdown at 180 kt. At

50,000 ft., that corresponds to a true airspeed of 450 kt.

Pilots wore MC-3 pressure suits for flights above 50,000 ft., but oil contamination made the suits unsafe, and the aircraft were restricted to altitudes below 50,000 ft. until a new pressure suit came along.

Endurance was about five and one-half hours, unrefuelled. Descent for a normal landing began about 70 miles out, because the RB-57D lacked any speed brakes. The landing gear and spoilers were extended for the entire letdown, which was made at 180 kt. Final approach was at 120 kt. and there was always a tendency to 'float' because of ground effect.

The last of the RB-57Ds are in storage at the Military Aircraft Storage and Disposition Center (MASDC), Davis-Monthan AFB, Ariz.

Pre-Production Preparations

Martin sent a team of design and production engineers to the United Kingdom for a month's stay at English Electric early in 1951. They familiarized themselves with the problem, and then headed back home to form the nucleus of B-57 design and production teams. By July, more than 200 engineers were working on the programme, and the manpower curve was expected to peak at about 350 by that autumn.

Late in July, the Air Force Board of Inspection saw the finished mock-up of the wing and cockpit. The final design of the aircraft was approved by the end of the summer.

There were problems in production, caused by the differences in production methods used by both countries. Initially, Martin engineers wanted to break the structure into components of a size that could be handled by automatic riveting machinery. For example, the top aft section of the Canberra fuselage was made in a single, hand-riveted piece, too large for US automatic riveting equipment. This section was redesigned to use shorter pieces, automatically riveted. The redesign meant extra weight, but saved production time and cost.

British practice called for hand-finishing late in assembly, fitting sheet-metal parts to tolerances as close as ± 0.005. Martin engineers, redrawing all the B-57 structure, specified sheet-metal tolerances of $\pm 1/32$ in. The change was accomplished while maintaining the outside mould lines of the aircraft. The end result was the same, without the cost of working to unjustifiably close tolerances.

The main spar bulkhead—called the 'garden gate' by British production engineers—had to be made at Martin from two slabs of 3-in. thick high-strength aluminium alloy, about $3\frac{1}{2} \times 8$ ft. in size. After hogging out much of the metal, the two pieces were assembled in the 'garden gate'. Martin engineers had hoped to forge the fitting as was done in England, but the size was too large for contemporary US forging capacity.

By early 1952, tooling was well along, with more than 12,000 separate tools developed by Martin, and another 13,000 or more tools built by subcontractors. Originally, more than half the airframe by weight was subcontracted. Major producers were Kaiser Metal Products, responsible for the outer wing panels and rotary bomb doors; Hudson Motors, who built the complete aft fuselage and empennage or tail assembly; and Cleveland Pneumatic Tool Co., who supplied the landing gear. Kaiser failed to meet wing deliveries; Martin took that contract back and built the panels in its own facilities.

Martin also subcontracted the engine nacelles, the nose cone, the pilot's canopy, all fuel cells, the tip tanks and much of the aircraft equipment. The company retained the main fuselage nose and centre section, the carry-through structure and wing centre section as its share of production, and did the final assembly and flight testing.

The B-57s were built in Martin Plant No 2, a facility used since World War Two by the Signal Corps. Martin got the plant back, rehabilitated it and laid out a line with 19 positions for B-57 production.

Contract Summary

The first B-57 development and production contract, designated AF33 (038)–22617–FPI–FY1952, was approved September 3 1953, long after the programme had started. It originally totalled $217,151,281.00, and included the construction of eight B-57As at a unit price of $5,920,381.50; 67 RB-57As at a unit price of $835,751; and 102 B-57B at a unit price of $679,100. The contract also covered the purchase of two Canberra B.2 pattern aircraft at a total cost of $901,061 plus $100,000 for spare parts. A mobile trainer and 103 special weapon bomb doors were included in the price.

Production schedule stretches and engineering changes raised the final cost of this first contract to $276,276,361.51, almost $60 million higher than the first contract price.

The follow-on production contract, designated AF33 (600)–22208–FPI–FY1953, was approved November 4 1953. It totalled $114,119,575, and called for the production of 191 B-57B models at a unit billing price of $500,991.11. In addition to the usual spare parts, tools and ground handling equipment, technical data, training and development work, the contract covered the cost of 191 special weapons bomb doors.

This second contract was revised in June 1955 to cover 38 B-57Cs and 120 B-57Bs, with 138 bomb doors. The 120 B-57B models were further reduced to 100 in October 1955, and the remaining 20 airframes were earmarked for the construction of the B-57D. The final total of this second contract was $115,477,008.66.

The third-production contract, AF33 (600)–25825–CPFF–FY1953, covered the RB-57D series.

Key to Colour Illustrations

1 Martin RB-57A (US Air Force serial 52-1490) of the Arkansas Air National Guard.

2 B-57A Canberra (AF: 52-1419) is a Miami-based 'hurricane hunter' with civil registration N1005.

3 NRB-57B (AF: 52-1581) was used as *Tropic Moon III* TV system test bed for the B-57G variant.

4 B-57B mid-1960s, operating in the Republic of Viet Nam with RVNAF military markings.

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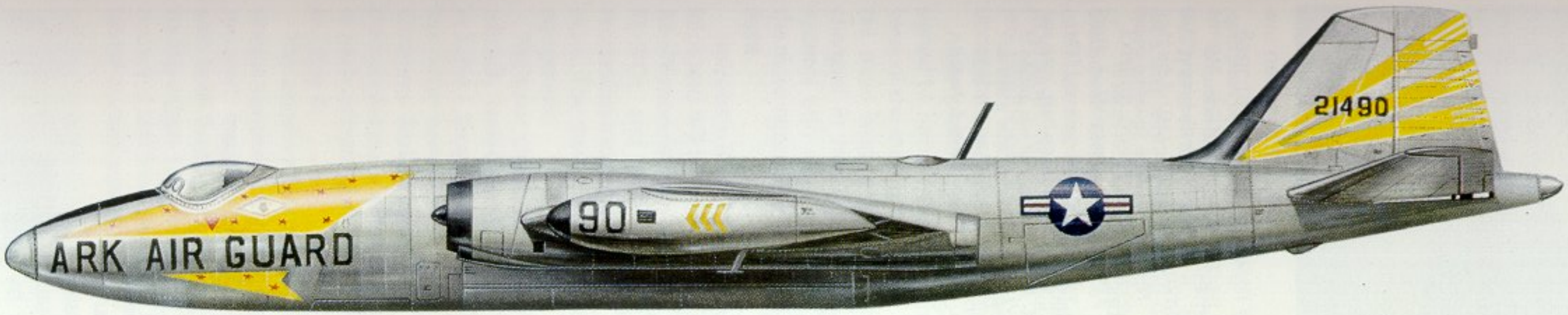

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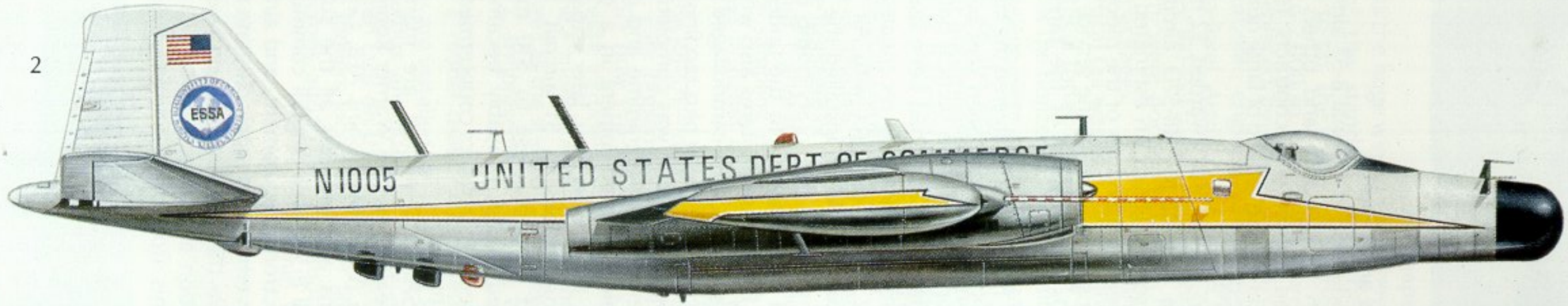

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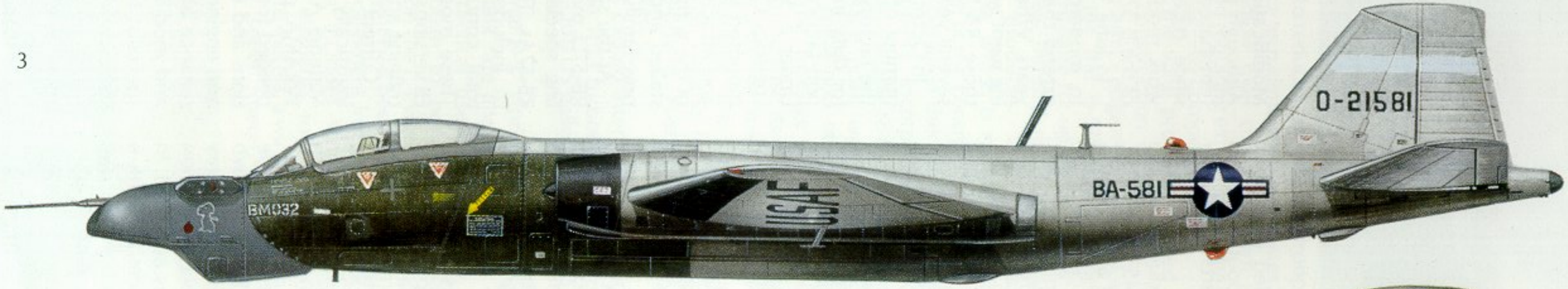

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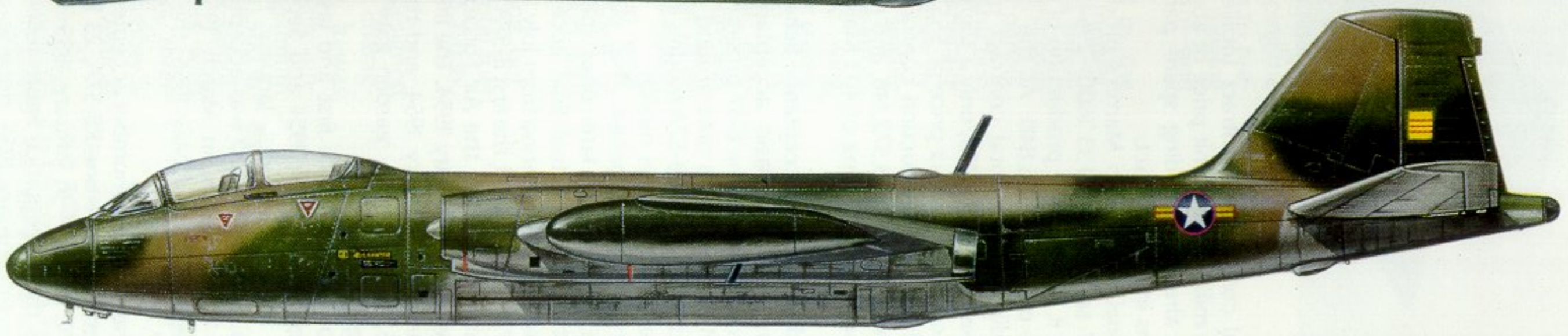
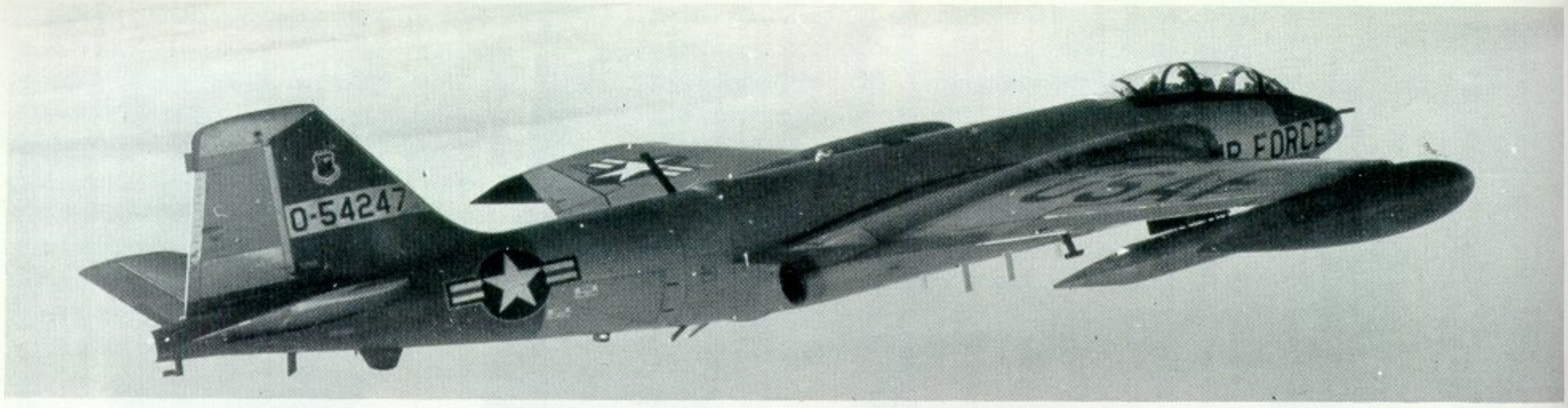




Carrying the red nose, drop tanks and tail colours of Alaskan Air Command, this EB-57E (55–4247) of the 21st Operations Squadron cruises above the overcast in February 1969. Note podded chaff dispensers and ECM antennas on belly, nose and tail. Aircraft was lost on 13 June 1969 after a mid-air collision with an F-102A. (Photo: via N. E. Taylor)

Final cost of the contract totalled more than $60 million, for a unit price of about $3 million per aircraft, including spare parts and other items in the contract.

Final contract in Martin's production of the B-57 series was AF33 (600)–29645–FPI–FY1955, and it covered the production of 68 B-57Es at a unit price of $816,840. At the close of B-57E production, the total contract price was estimated at $58,210,073, only a slight over-run on the original contract price of $55,545,120.

These four production contracts came to a grand total of $510,572,148, and paid for design through flight-testing of 403 Martin-built B-57s.

Production and Acceptance Schedules

There were 11 basic acceptance schedules during the life of the B-57 programme. The first, in March 1951, was built around an envisioned production of 250 B-57A models at a rate reaching a peak of 50 per month.

This never happened. That particular schedule gave way to later ones specified by firm contracts, and actual final acceptances were stretched over a period from July 1953 to March 1957. For the record, the first B-57A was accepted in August 1953 by the Air Force; the last was delivered in February 1954. The first RB-57A was accepted in January 1954, and the last in May 1955, delayed for a 'garden gate' modification programme.

For the B-57B, the first and last acceptance dates were August 1954 and September 1956; and for the C model, January 1955 and May 1956. The first RB-57D was accepted in November 1955; the last in March 1957. First B-57E acceptance was in May 1956; the last in March 1957.

The maximum number accepted in any single month was 26—one RB-57A, 23 B-57B and two B-57C aircraft—in January 1955. But in no way does this acceptance figure reflect production rates. In February 1955, none was accepted. In March, April and May, acceptances were 24, 6 and 16 respectively. These fluctuations are why one should always question quoted production rates of 'X aircraft per month'. The important number is acceptances by the customer, not aircraft shoved out the door by the manufacturer.

Modifications and Rebuilds

Although production of original B-57 airframes terminated in 1957, Martin and others have since received subsequent contracts for rework, modification and rebuild of large numbers of the B-57 fleet.

In June 1965, Martin was awarded $2 million to modernize nine of the RB-57D aircraft to extend their service life by an estimated eight years. Whether the estimates or the modernizing went wrong is not known; the service life of those RB-57Ds ended short of the target by several years.

In October 1956, Martin delivered the last of a number of B-57s which had been sent back to the factory for conversion to tactical bombers for duty in Viet Nam. They had been used for non-tactical missions such as reconnaissance. Under a $4.2 million contract with Air Force Logistics Command, Martin installed the wing-mounted guns, added the rotary bomb doors, and attached rocket pylons to the undersides of the wings. Fire-control systems also were installed, and the aircraft were camouflaged in the now-familiar two-tone green plus tan finish.

At the same time, Martin was completing its RB-57D modernization programme and installing special electronic equipment in a dozen RB-57As. This latter work was later expanded to include installations in 51 aircraft for a total contract amount close to $10 million. These modified aircraft probably became the EB versions used in electronics countermeasures training and missions.

Current USAF B-57 aircraft are managed, logistically speaking, by the Warner Robins Air Materiel Area (WRAMA), Robins AFB, Georgia. WRAMA plans and provides all the support needed for all B-57s, including all communications and electronics equipment, and airframe and engine overhaul and repair. Routine maintenance above the field level, repair, overhaul and modification are done at WRAMA, or by specialist teams around the world working out of WRAMA.

General Dynamics RB-57F

The RB-57F programme started with a requirement for high-altitude sampling aircraft. The result was a major rebuild of the B-57, done by

General Dynamics at Fort Worth, Texas. Under *Project Peewee*, GD/FW received an October 1963 contract to modify two aircraft. Subsequent contracts were issued to cover the modification—actually more of a complete rebuild—of 21 aircraft.

Candidate airframes were drawn from RB-57A, B-57B, and the then-grounded RB-57D fleet. General Dynamics salvaged not much more than the fuselage centre and aft sections, the horizontal tail and the landing gear. Everything else—plus the cockpits of the RB/A aircraft—was new construction.

Basic to the RB-57F design was the huge wing, almost doubling the span of the standard B-57s, and stretching 122 ft., tip to tip. The wing area was more than doubled, to 2,000 sq. ft.

Existing powerplants were replaced by new Pratt & Whitney TF33-P-11A turbofan engines, each rated at 16,500 lb t. at sea-level. Auxiliary jet engines, two Pratt & Whitney J60-P-9 turbojets producing 2,900 lb t. each, were podded under the wings in removable packages.

A completely new, larger vertical tail was designed to handle the asymmetrical thrust problem of the increased power, but the horizontal tail, main landing gear and fuselage were only changed in minor ways. Most of the aircraft systems also were changed, to accommodate the more rigorous requirements of high-altitude flight.

Seventeen RB-57F aircraft were built, using the RB/A and B/B airframes as a basis. The last four RB-57F models were built on the fuselages of the RB-57Ds, and were intended for high-altitude reconnaissance rather than air sampling missions. The two batches differed in detail and equipment.

The basic characteristics of the RB-57F—now officially redesignated WB-57F—are presented in Table I. Incidentally, the RB-57F now WB-57F has never been named either Night Intruder or Canberra. Serial numbers of the F models and their predecessor airframes, as well as the status of each aircraft at August 1 1972, are presented in Table III.

The enormous wing of the F model uses a unique control system. No flaps are installed, or required. Instead, inboard ailerons are fitted, with both fixed and movable trim tabs on their trailing-edges. Large retractable spoilers, located outboard and forward of the ailerons, add to the lateral control power.

Another view of EB-57E (55–4247) shows it coming in for a landing at Elmendorf AFB, Alaska.
(Photo: N. E. Taylor)

The wing was designed with $-1\frac{1}{2}^{\circ}$ anhedral in the outer panels, for added stability during take-off and landing. The wingtip leading-edges are shaped to reduce trim drag; by drooping the tips, they act as rudimentary end plates to prevent the airflow over the wing from moving spanwise and requiring extra elevator trim—and therefore drag—to compensate.

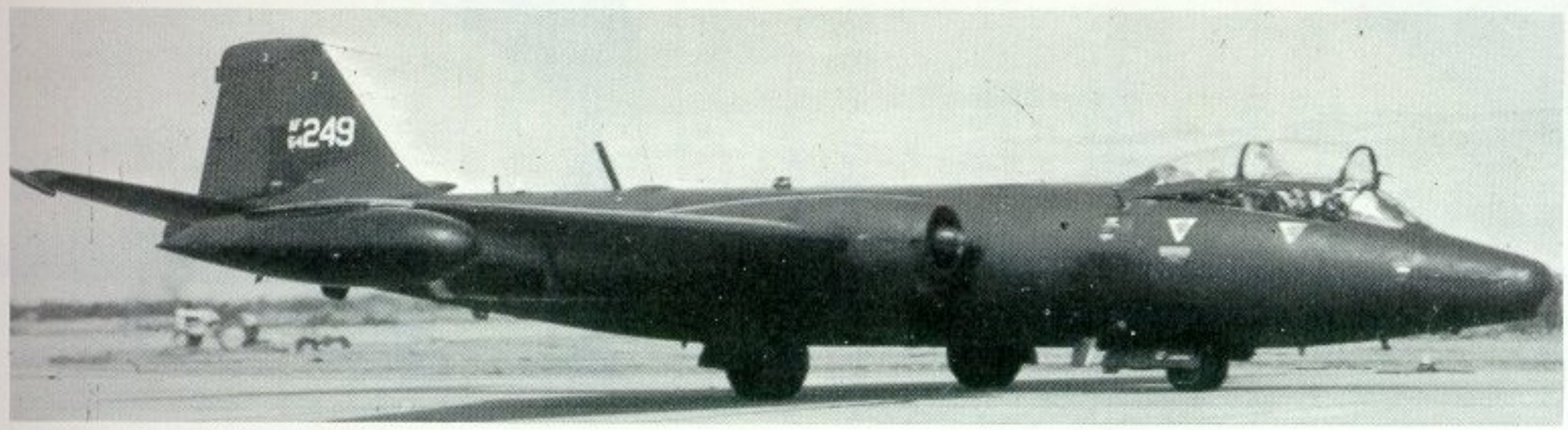
To avoid the wing problems caused by the single-spar construction of the basic models, General Dynamics engineers designed a three-spar wing for the B-57F, using honeycomb sandwich structure for upper and lower panels. There are few internal ribs. This construction technique produces an aerodynamically smooth wing, which is refined still further by careful fitting of the control surfaces and sealing of the gaps between them and the wing structure. Hardpoints incorporated in the wing structure are available to mount external stores.

The fuselage nose was enlarged to carry specialized radar and other equipment; consequently, the fuselage forward section was reworked to increase its diameter about three inches. The internal fuel tank was removed from the fuselage, and other clean-up work freed a large volume for the installation of special equipment. Fuselage dive-brakes also were removed.

All fuel is carried internally in the wing, outboard of the TF33 turbofan nacelles. Total fuel capacity is 3,870 US gallons, or about 25,150 lb., of JP-4.

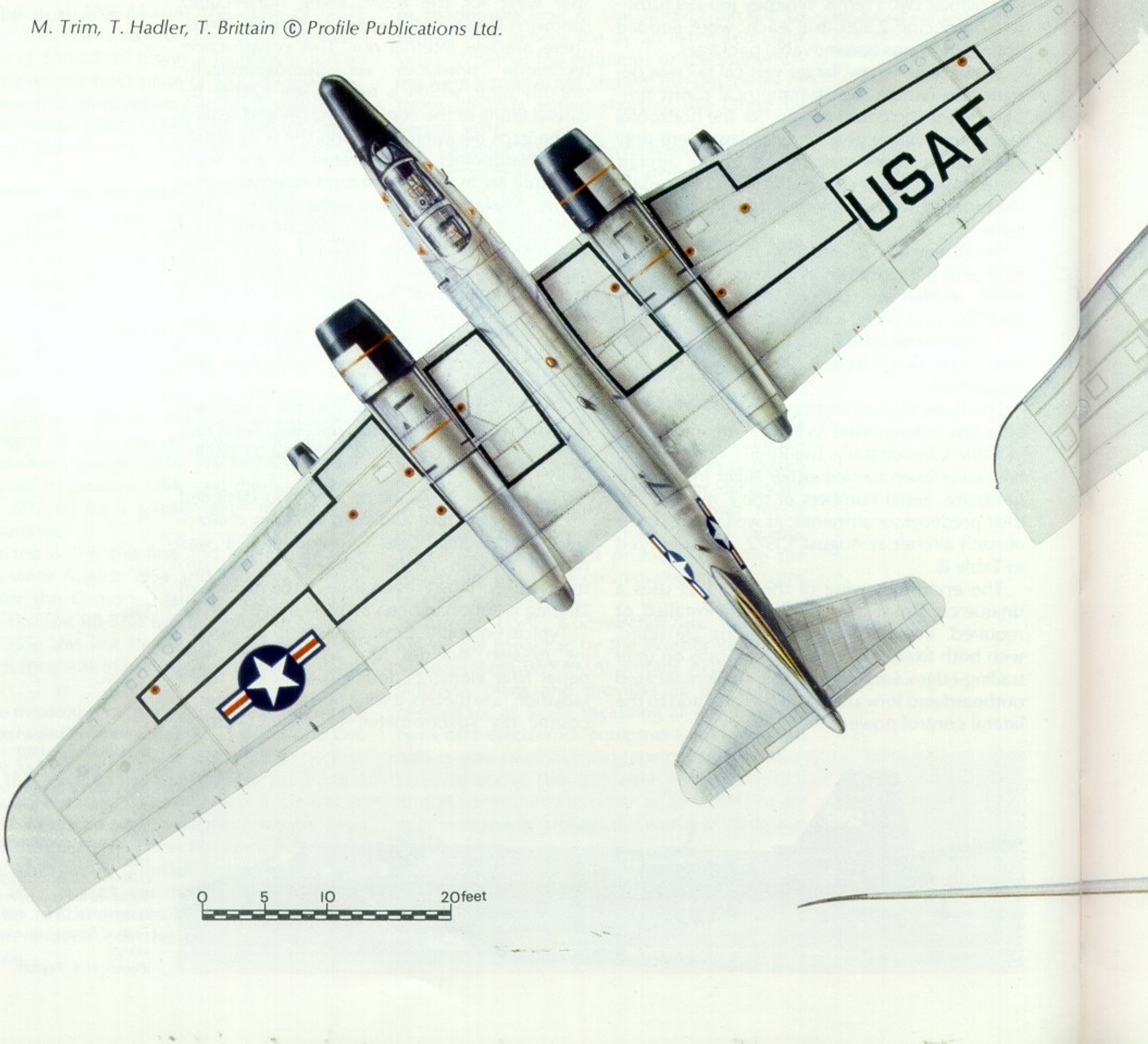
The original B-57 landing gear was designed for a high sink rate and hard landings characteristic of tactical use. Consequently, it was rugged enough to be used—essentially unmodified—on the F, even though the maximum landing weight had been increased to 61,500 lb.

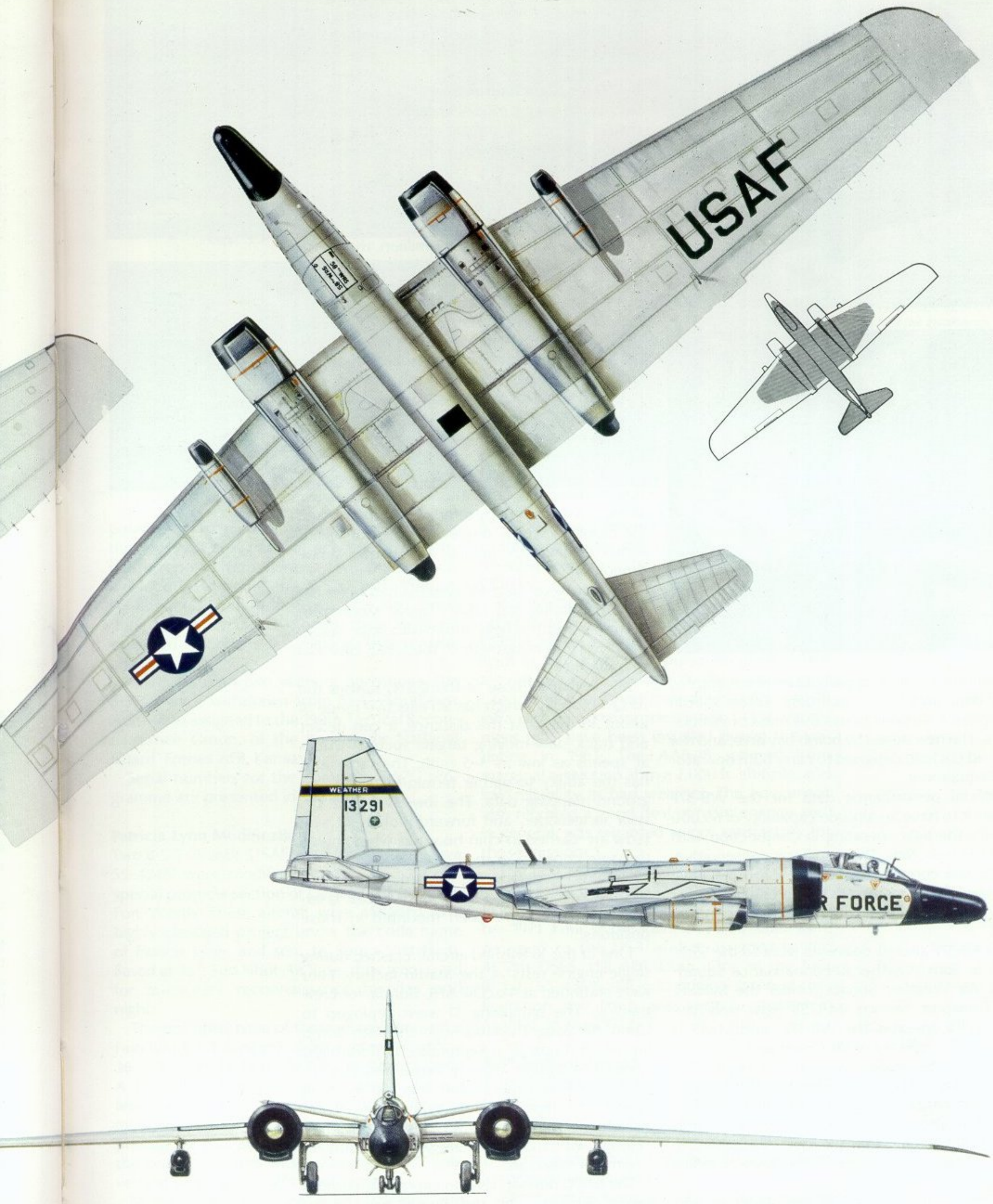
Typical equipment installed for an air-sampling mission 'includes four air samplers with paper filter elements, four gas samplers, three radiation rate meters, a wing pod ion chamber, a cosmic ray spectrometer, an F-415P vertical



One of the Patricia Lynn *aircraft, B-57E (55–4249), returns to Tan Son Nhut AB, Viet Nam, after a mission on December 14 1970. Note the elongated nose which housed a forward-looking Fairchild KA-1 camera. Aircraft is in flat black finish with flat white tail codes; it was assigned to Det. 1, 460th Tactical Reconnaissance Wing.*
(Photo: N. E. Taylor)

General Dynamics WB-57F (ex-RB-57F; AF serial 63-13291A) of the 58th Weather Reconnaissance Squadron, Air Weather Service, Military Aircraft Command. The 58th WRS operates from Kirkland Air Force Base, Albuquerque, New Mexico. Growth of RB/WB-57F over conventional planform is indicated by the small sketch on the facing page.




USAF
WEATHER
13291
R FORCE

This B-57E of the 8th Tactical Bomb Squadron made it to Ubon AB, Thailand, after absorbing ground fire during a bomb run over Viet Nam in September 1968. Owl under the US insignia is the marking of the 497th Tactical Fighter Squadron of the 8th Tactical Fighter Wing, and how it got on a B-57E of the 8th TBS is one of those mysteries. Clue: The 8th TFW was based at Ubon in 1968.
(Photo: Capt. Al Piccirillo via N. E. Taylor)

Suit checklist is final step before engine starting on a WB-57F flight. Here Sergeant Jesse Harris reads the checklist to navigator Major Edwin Hull before takeoff.
(Photo: USAF/AWS)

panoramic camera for particulate photography, and data and voice recorders. Three special equipment sections house this mass of installations: The new nose, the bomb bay area, and the second cockpit, designed to carry both operator and equipment.

Official performance data for the WB-57F shows it to have an altitude capability of 65,000 ft. with the J60s operating in conjunction with the TF33 turbofans. This number is conservative.

The first converted RB-57F flew in April 1964, and the USAF accepted its first aircraft in June of that year. Production continued through March 1967.

All RB-57F aircraft delivered went to the 55th, 56th or 58th Weather Reconnaissance Squadrons, Air Weather Service, under the Military Air Transport Service (MATS). Now only the 58th WRS operates the WB-57F; and MATS is now MAC—Military Airlift Command.

Convair Aerospace Division of General Dynamics still repairs and overhauls WB-57F aircraft under a continuing contract with USAF. The company also does special modifications, such as installations used on the WB-57F supporting NASA's Earth Resources Technology Satellite programme.

With more than 30 different agencies and friendly foreign governments now stating requirements for high-altitude data, the WB-57F appears assured of continuing operations for years to come.

B-57G for Night Interdiction

Last of the major modification programmes for the B-57 produced the aircraft that was able to tackle the job for which the B-57 had been chosen 20 years earlier.

Specifically, the B-57G was developed to detect, track and strike targets in total darkness. Under a prime contract to Westinghouse Electric Corp. for about $49 million, the Martin company modified 16 B-57B airframes to include a nose section packed with electronics and electro-optical equipment.

In the G nose were Texas Instruments' AN/APQ-139 forward-looking radar and AN/AAS-26 forward-looking infra-red (IR) detection system. Westinghouse low-level light television, laser rangefinder and AN/AYK-8 weapons delivery computer completed the nose package. In the belly was a 20-mm. Emerson Electric cannon turret.

The radar and IR systems were used for target detection, and the laser for ranging. Weapons were fired by reference to the cockpit TV monitor, which displayed both the electronics and electro-optical information simultaneously.

The low-level light TV systems had been developed during the USAF *Tropic Moon* programme, and the belly turret with laser rangefinder was an outgrowth of the USAF *Pave Gat* programme.

The reshaped nose of the B-57G houses the APQ-139 radar, which has an effective range of about 10 miles. At this distance, it can detect and track slow-moving targets such as trucks at speeds as low as 3–5 mph. The radar also has the ability to gather terrain-following and ground-mapping data. The low-level light TV, laser rangefinder, and forward-looking IR systems are carried in chin housings which bulge the nose contours of the B-57G.

Underwing pylons are carried for external weapons, three on a side, and Mk.82 laser-guided bombs have been mounted in those positions.

One of the 16 finished aircraft crashed during single-engine tests at the Martin factory. Four were stationed at MacDill AFB, Florida, for crew training. The remaining 11 were deployed to Ubon Air Base, Thailand, with the 13th Bomb Squadron (Tactical) in September 1970 for night operations against moving targets on the Ho Chi Minh Trail. One aircraft was lost in these operations, reportedly to ground fire. Later indications were that it was lost in a mid-air collision with a Cessna 0-2A FAC—Forward Air Controller—aircraft.

The B-57G did not have an impressive combat record. Reports said the aircraft was under-

Last RB-57F built, this aircraft is shown in the markings of the Air Weather Service, which operated all the F models. Redesignated as a WB-57F by USAF in 1971, this aircraft (63–13503) was transferred to NASA in 1972, and is operated by the Manned Spacecraft Center.
(Photo: USAF/AWS)

The camera pallet under the fuselage of this WB-57F was developed for the corn blight experiments, and is typical of the installations that will be used in support of NASA's ERTS (Earth Resources Technology Satellite) programme.
(Photo: NASA)

powered for its mission. There were some regrets that the Air Force had not accepted the alternate proposal from General Dynamics, which included re-engining the B-57G with Pratt & Whitney J57 turbojets. Since this had been done earlier for the D models, there were no expected problems in making that engine change.

After less than two years of operations, the B-57Gs were withdrawn from SEA—Southeast Asia—and assigned to the 190th Tactical Reconnaissance Group, of the Kansas Air National Guard, Forbes AFB, Kansas.

Serial numbers for the complete B-57G programme are presented in Table IV.

Patricia Lynn Modifications

Two B-57E aircraft (USAF serial Nos 55–4243 and 55–4245) were modified in early 1963 by the special projects section of General Dynamics at Fort Worth. These aircraft were assigned to a highly classified project under the code name of *Patricia Lynn*, and sent to South Viet Nam. Based at Tan Son Nhut Air Base, they were used for in-country reconnaissance by day and night.

The reshaped nose of these aircraft housed a Fairchild KA-1 forward oblique camera with a 36-in. lens, and a Fairchild KA-2 vertical camera. A Fairchild KA-56 panoramic camera, whose lens sweeps from horizon to horizon, was mounted vertically in the bomb-bay for ground photography at altitudes below 200 ft. Also in the bomb-bay area was a Fairchild F-477 split vertical camera for night photography.

Within a year, two more B-57Es (55–4237 and 55–4249), now painted matt black, were added to the force. Later still, two more (55–4257 and 55–4264) received the same modifications at GD/FW.

In 1965, 55–4243 and 55–4245—and possibly other *Patricia Lynn* aircraft—were sent back to GD/FW for systems updating. Reports from Viet Nam in 1967 identified special reconnaissance aircraft using, in addition to the camera gear cited earlier, a Texas Instruments AN/AAS-18 infra-red reconnaissance system. That equipment may have been installed during the updating in 1965. The AAS-18 suffered from marginal resolution above 2,000 ft. altitude, and low reliability in bad weather. The equipment also required a good deal of maintenance and, in general, was regarded as not satisfactory for those missions.

The unit responsible for operating these few special B-57s, the 460th Tactical Reconnaissance Wing, was deactivated in Viet Nam in September 1971. Four of the *Patricia Lynn* aircraft were returned to the USA and re-assigned to the 4677th DSES, Hill AFB, Utah. One of the four (B-57E: 55–4249), still in its original external configuration and finish, was sent to storage in MASDC in May 1972.

B-57 Testbed Aircraft

Complete details on the many B-57 aircraft used for test and development programmes are far beyond the scope of this *Profile*. The following brief mention of some of the programmes and projects with which B-57 aircraft have been associated emphasizes this:

Operation Redwing, with the Defense Atomic

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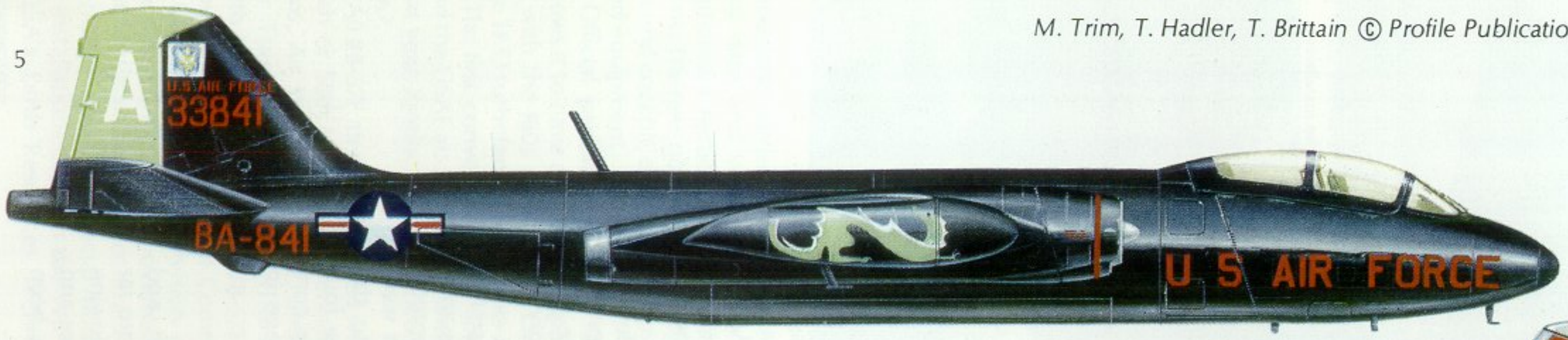

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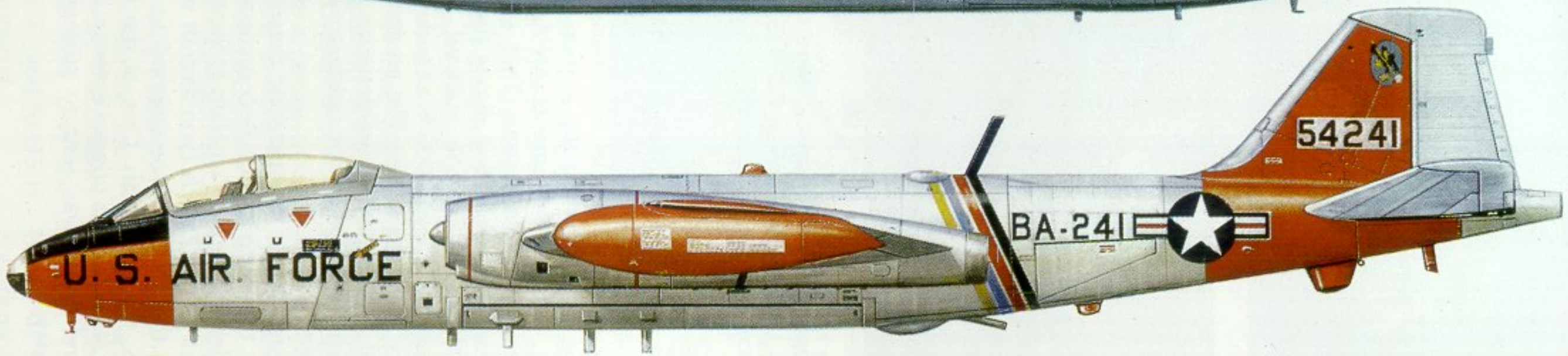

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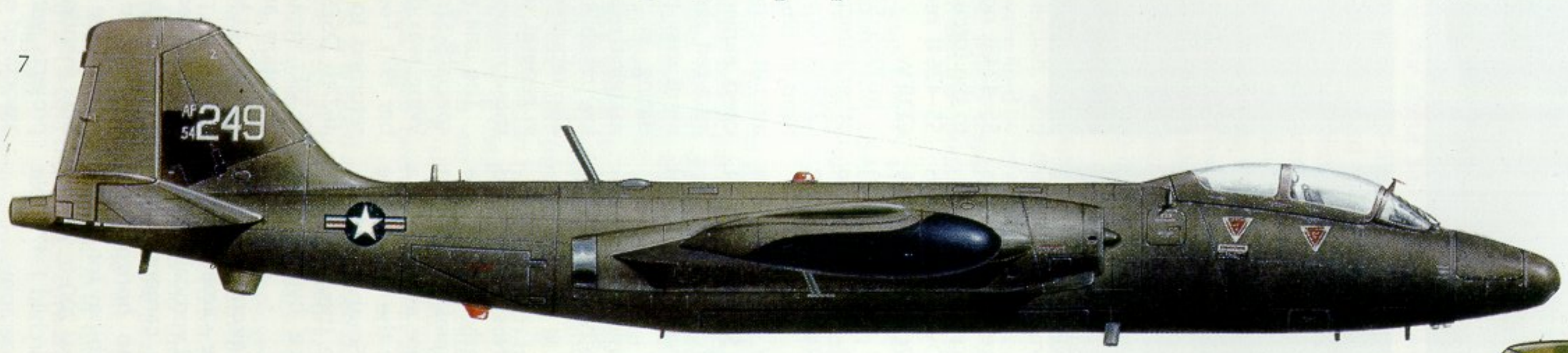

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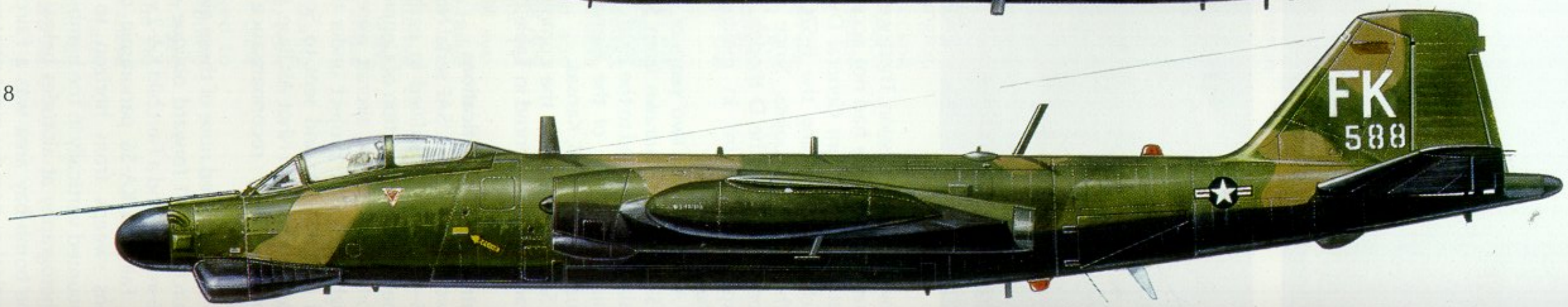


Support Agency (1960); high-resolution low-level light television systems (1966–1968); *Compass Eagle* infra-red reconnaissance system (1967); Hughes QRC-341 infra-red warning system (1967); radar camouflage techniques (1967); high-level aerial cloud photography (1969); *Pave Gat* system with Emerson Electric belly turret and laser range-finding (1970); Mk.82 laser-guided bomb (1970).

Additionally, B-57 aircraft were used to aid the development of pump-fed liquid-hydrogen fuel systems, to calibrate solar cells, to measure the spectra of reflected solar energy, and for at least 19 of the *Coldscan* flights to measure atmospheric turbulence and temperature gradients at SST—supersonic-transport—altitudes.

At least one B-57B (51–1497) was modified by Temco Aircraft Corp. in 1956 for tests of the Boeing IM-99A Bomarc guidance system. The modification added a 17-foot section of the missile nose to the B-57 forward fuselage. Separate hydraulic and electrical systems, and ammonia and nitrogen tanks, for cooling and pressurizing the missile, were added, too.

The B-57 structure was strengthened to take the extra loads, and the weight increase. After static and flight tests at Temco, the B-57B was delivered to Boeing for further testing, and then turned over to the Air Force Missile Test Center for flight research on the Bomarc guidance system.

Two B-57B aircraft (52–1539 and 52–1562) were fitted with the nose sections of the Goodyear Aerospace Corporation's TM-76 Mace missile, and used to simulate the missile's tracking capabilities in flight paths which closely corresponded to programmed paths for the TM-76.

NRB-57B (52–1581), now in storage at MASDC,[1] began its versatile test career when the Air Force loaned it to CAL—Cornell Aeronautical Laboratory—for flight research with the Autoflite terrain-following system that had been developed at CAL. Flight tests were run between 1958 and 1962. The aircraft was then assigned to Westinghouse for tests of another type of terrain-following system and, still later, for tests of the *Tropic Moon* systems. It was eventually developed into the *Tropic Moon III* configuration, basis for the B-57G.

An RB-57D was used in 1964 on Project APRE (Aerospace Photographic Reconnaissance Experiments), marked with a lens-resolution test pattern on its upper surfaces in sharply defined shapes of flat white against a flat black background. A single neutral grey area, for verification of colour rendition, was marked on the left horizontal tail. A number of convex mirrors also were part of the test array.

In the experiments, a test camera was carried in a balloon gondola to altitudes near 100,000 ft. The RB-57D was vectored to pass within the field of view, at pre-determined altitudes below the balloon. The resulting photographs helped evaluate the camera lens and the film emulsions used, and undoubtedly contributed to later successful reconnaissance by high-altitude aircraft and satellites.

Several JB-57B aircraft, based at Patrick AFB, Florida, and assigned to support the Air Force Missile Test Center, were also used for lens-resolution tests. Carrying a test pattern painted on the forward right fuselage, these JB-57Bs were used in calibration of missile tracking cameras.

Allocations

The first eight B-57A aircraft were committed to test programmes and were never assigned to operational units. The first RB-57A units equipped were part of the 363rd Tactical Reconnaissance Wing, based at Shaw AFB, South Carolina. The first B-57B units were with the 461st Bomb Wing (Light), based at Hill AFB, Utah, and the 345th Bomb Wing, based at Langley AFB, Virginia.

During subsequent years, B-57s served with a large number and variety of units. Known B-57 allocations are summarized in Table VIII.

Pakistan received a quantity of B-57s under the US Military Assistance Programme (MAP). Their serial numbers are listed in Table V, but reliable data on their present status is not available.

Military Operations

The first large-scale operation in which B-57 forces participated was *Exercise Sagebrush*, conducted in 1955 across the lower eastern quarter of the US. More than 140,000 US Army and USAF personnel and 800 USAF aircraft were based on more than seven million acres of Louisiana, with 17 'aggressor' and 24 'defender' air bases stretching across the arc from Langley AFB, Virginia, to the Texas-Mexico border.

The aim of the exercise was to find out whether an aggressor, hitting suddenly with nuclear weapons, could win a quick victory over defending forces that were well dug in.

It was no contest. The B-57s struck on November 15, the first day of the exercise, and within two hours had 'knocked out' 18 defender bases. At daybreak on November 16, both sides launched air strikes against opposing air bases. During that day the B-57s 'knocked out' 19 of the defender's 24 air bases, while the aggressor forces lost six. The remaining five defender air bases were clobbered that night by repeated B-57 strikes.

The B-57s, moving fast and striking with speed and accuracy, had outmoded the time-honoured schedules for conventional warfare, and had proved that an aggressive attack could knock out well-established forces in the field.

The aggressor forces were drawn from the 461st Bomb Wing and the 363rd Tac Recon Wing, both part of Tactical Air Command (TAC).

Key to Colour Illustrations

5 Martin B-57C Canberra (AF: 53-3841), 405th Bomb Squadron, 38th Bomb Wing, USAFE, at Laon, France, July 1957.

6 EB-57E (AF: 55-4241), 4677th Defense Systems Evaluation Squadron (DSES). Fuselage diagonal stripes are unofficial.

7 B-57E (AF: 55-4249), a *Patricia Lynn* aircraft of Detachment 1, 460th Tactical Reconnaissance Wing, Viet Nam, 1970.

8 B-57G (AF: 52-1588), 13th Tactical Bomb Squadron, at Ubon Air Base, Thailand, mid-1971.

[1] MASDC—Military Aircraft Storage and Disposition Center, Davis-Monthan AFB, Ariz.

The next year, aircraft from the 461st flew a goodwill tour of Latin America, under the code name of *Vista Able*. Other TAC B-57s were part of *Mobile Charlie*, a deployment to support *Exercise Counterpunch* in Europe.

These deployments were the routine sort that characterize peacetime duty. But, in July 1958, there was a threat—real or imagined, historians still argue—in Lebanon. On July 15, TAC went on a war footing, and ordered the 19th Air Force to deploy Composite Air Strike Force (CASF) 'Bravo' to Incirlik Air Base, Turkey. Within three hours of the alert, a dozen B-57Bs were out over the Atlantic headed for Turkey—and 100 days of waiting for nothing to happen.

But during the 100 days, something happened on the other side of the world: Another crisis, this time centred on Taiwan. On August 29 1958, the 12th Air Force sent the 399th Bomb Squadron, equipped with B-57Bs, to Taiwan as CASF 'X-Ray Tango'.

TAC kept two wings—the 461st and 345th—equipped with B-57s until both wings were deactivated, the 461st on April 1 1958 and the 345th on June 25 1959. One squadron of B-57E tow-target aircraft stayed on TAC strength until June 1962.

By then, the action in Southeast Asia was heating up, and the first combat deployment was not far off.

LABS Manœuvre

From 1956 through mid-1965, the B-57 was one of the USAF aircraft assigned to the special weapons delivery mission—strikes with nuclear weapons. The characteristics of tactical nuclear bombs demanded new and different methods of dropping them. The Low-Altitude Bombing System (LABS) was developed for that kind of mission.

What it was like to make such a delivery from a B-57 is well described by Robert C. Mikesh, Major USAF, (Ret.), who spent a lot of time in B-57 cockpits.

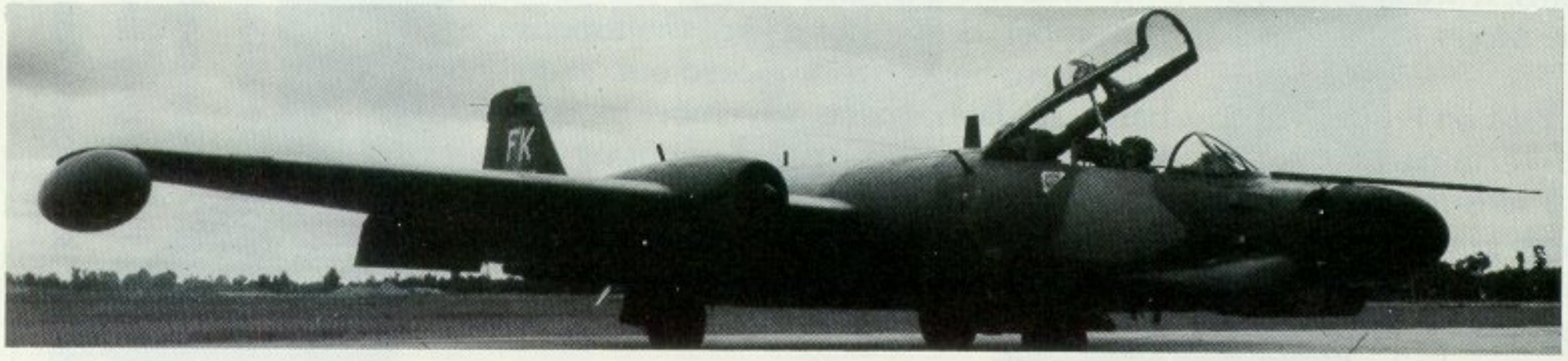
'In inter-unit LABS competitions with other aircraft types including the F-100, the B-57 crews would win hands down with a wide margin in score. The B-57 was a very responsive and stable bomb delivery platform.

'This was a challenging manœuvre; the run-in to the target was right on the deck to avoid detection. At 425 kt. this was usually a rough ride due to surface wind turbulence, like riding a steel beam down a corduroy road. It made my left arm flail around when not hanging on to the throttles and when attempting to actuate the bomb door switch and the bombing system. When the door rolled open, only a little extra power would hold 425 kt. precisely.

'When right over the target, or at an offset point to compensate for wind, the 'pickle button' on the control wheel was depressed and held, throttles opened to full power, and a pull-up of 3.5 g. was immediately begun, starting a half-loop. Wings had to be kept level relative to the vertical plane, and a constant back pressure was necessary on the controls. Special instrumentation was provided for this delivery, but it still required considerable practice to execute it accurately.

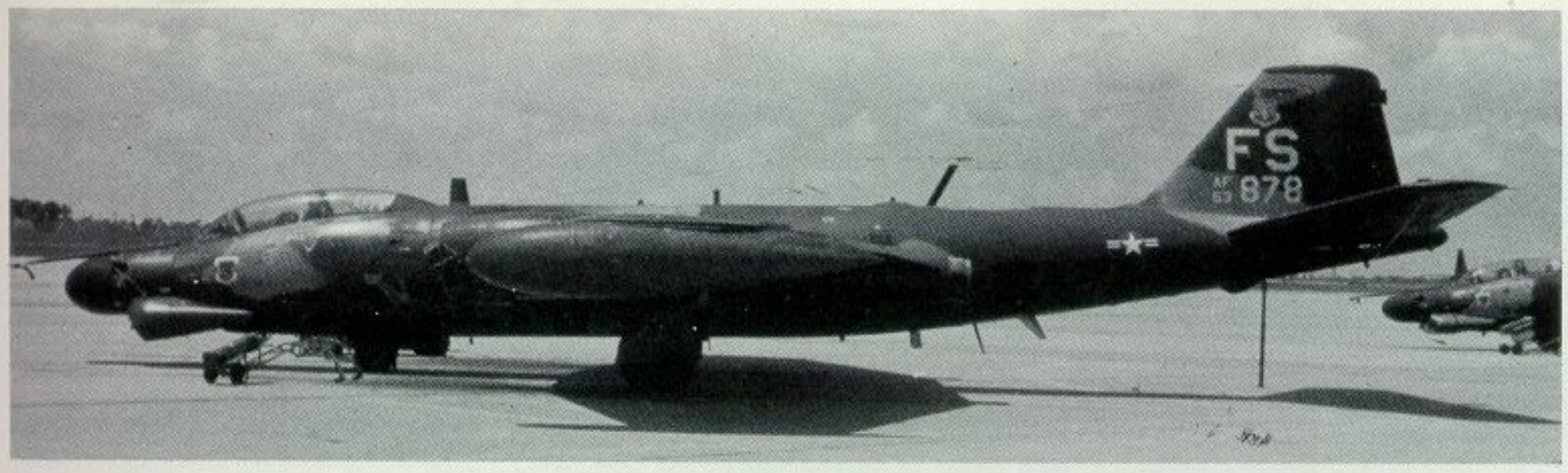
'At somewhere near the 120-degree point of the pull-up, the bomb was automatically released at the point which was preset into the instrument before takeoff. The release of a three-quarter ton bomb at this point with these g. forces applied resulted in a shocking and sudden jolt. The bomb continued up to about 15,000 ft. while the airplane was topped out of the loop at about 9,000 ft. Back pressure was relieved to about 1.5 g. or even less after release, as the speed could decrease to as low as 160 to 140 kt. This reduced the possibility of snapping at the top prior to the intended roll-out, or stalling which could result in an inverted spin.

'Once the bomb was away, the manœuvre became essentially a visual recovery. The horizon was picked up as a reference by looking straight overhead. After the nose passed well through the horizon at an inverted dive angle of about 40°, a half roll set things upright again. It took the full strength in both arms, and one knee wedged against the side of the cockpit, to



Carrying the tail code letters for the 13th Bomb Squadron Tactical ('Grim Reapers'), this B-57G sits between missions at Ubon AB, Thailand.
(Photo: USAF 107539)

Ominous look of this Thailand-based B-57G is accentuated by its squat posture and the black undersurfaces standardized on all B-57G aircraft.
(Photo: USAF 107538)



Last of the B-57G batch, 53–3878 was converted from a B-57B and assigned to crew training at MacDill AFB, Florida. Tail code identifies the 1st Tactical Fighter Wing, whose 4424th Combat Crew Training Squadron operated this B-57G. Insignia of 1st insignia is on vertical tail. (Photo: Ken Buchanan)

Nose details of B-57G (53–3906) assigned to the 1st Tactical Fighter Wing, emphasize the shape of the jowl fairings added to house the special sensors. Note that the nose is also extended as well as modified in contours; the bay behind the radome was necessary to mount the extra installations. Long boom protruding forward is an accurate pitot head. (Photo: Ken Buchanan)

Jowl fairings on this Martin B-57G, climbing away on a test flight from the factory, house the low-level light television system and other advanced sensors for the night attack mission. (Photo: Westinghouse)

twist the control wheel enough for a coordinated and smooth roll-out. Even the seat was felt to shift to the side because of the body forces. But aside from this, the B-57 responded well throughout the manœuvre.

'We needed all the speed possible in the escape, so we closed the bomb door and didn't retard the power. The dive toward the ground at full throttle gained back the lost speed very rapidly. With level-off right on the deck at maximum speed, the B-57 was well down the road before impact.'

Combat Operations

Two B-57E aircraft, originally built to tow targets but converted for reconnaissance, pioneered the combat operations. They were sent to South Viet Nam in May 1963, under the code-named *Patricia Lynn* project. One of the two—B-57E (55–4243)—was the first B-57 to sortie against a live enemy. Captain William Scott was pilot and Lieutenant Leo Otway was his navigator. The date was May 7, 1963.

For two months, these two aircraft were the sole representatives of the B-57 fleet to hear guns fired in anger. In July 1963, two more *Patricia Lynn* aircraft were added, and the four-plane unit was designated as Det. 1, 460th Tac Recon Wing.

The Tonkin Gulf incident was the ultimate cause for the 'mass' combat deployment of the B-57. On August 4 1964, Secretary of Defence Robert S. McNamara ordered 36 B-57s to South Viet Nam. They arrived on August 7. Later reports said that one crashed on final approach, killing the crew. An additional three were reported damaged in landing accidents.

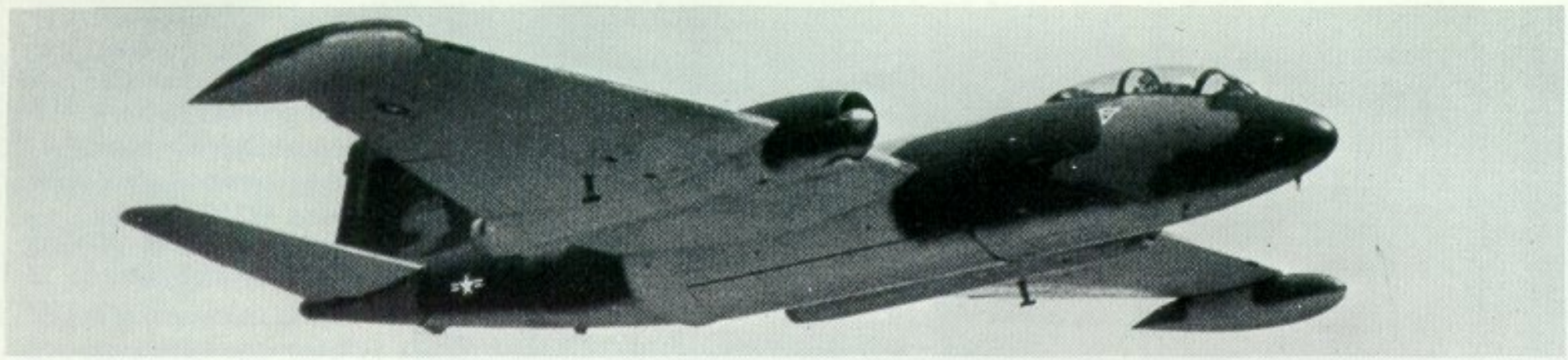
From August on through most of the year, there were no references to combat by the B-57s. They may have been committed cautiously, or on recon missions to gain familiarity in the area.

But on November 1 1964, Viet Cong mortars found the range of the Bien Hoa flight line, pounded five of the B-57s to bits and damaged as many as 22 of the remainder. Those losses, added to the one that crashed and the three that were damaged on arrival, never were made good. The total reported strength of the entire B-57 fleet in Southeast Asia never exceeded 21 aircraft from then on, and frequently was less.

The first interdiction strikes and the first combat for the B-57s came February 19 1965, when a combined force of B-57B and North American F-100 Super Sabres aircraft struck targets in Phuoc Tuy province, about 40 miles east of Saigon. There were no details of the raids, either at that time or later.

In fact, the exploits of the B-57s in that tragic theatre of war probably never will be described adequately, except in the afterglow of later years at crew reunions. The missions involved no mass raids, no massive strikes, no air-to-air combat against enemy pilots. Their job was interdiction. They bombed up, went out and dropped their weapons, fired their rockets and cannon, came back to base, and repeated the entire procedure. That kind of work is unsung in any war, and there were no special heroes. They were all heroes.

In April, reports gave the total B-57 strength as 16 B-57B and three RB-57—model suffix unspecified—based at Bien Hoa. In May 1965, hard luck struck again. During a bombing-up before a strike, a 500-lb. bomb with a delayed-action fuse exploded on the flight line among ten B-57s parked wingtip to wingtip. All were destroyed. The only reason the other six on



Factory-fresh three-tone and grey camouflage finish marks this B-57B as a recently modified aircraft about to head into combat in Southeast Asia. Work was done during 1966.
(Photo: Martin Co.)

A sunshade shields the cockpit from the desert sun on the flight line at NASA's Flight Research Center, Edwards, Calif. This B-57B, registered NASA 809, is used for tests of the Viking Mars-lander parachute, and for probing the upper atmosphere for clear-air turbulence.
(Photo: NASA)

strength were not destroyed is because they were off on a strike.

This time the losses were replaced, and strength was brought back up to about 20 aircraft before the end of the year. Meantime, the Republic of Viet Nam in the person of Air Vice Marshal Nguyen Cao Ky complained loudly because its air force was not operating jets. The gripe was heard and, in August 1965, four B-57B aircraft were 'transferred' to the RVN Air Force. The white bars on the US insignia were overpainted with yellow, short horizontal yellow identification bars were added on the rudders, and the RVNAF was, overnight, a jet force. The only problem was that there were then no rated jet pilots in the RVNAF, and so USAF crews continued to fly the RVNAF B-57Bs, sometimes giving an RVNAF officer a ride in the back seat after telling him to keep his hands the hell off the controls.

In October 1965, B-57Bs were part of a strike force that lifted the six-day siege of Plei Me. More than 700 sorties were flown against targets in that area by a mixed air component of B-57s, A-1, F-100 and F-8 aircraft.

By January 1966, there was a total strength of 20 B-57s in South Viet Nam, and by July that year, it was reported—perhaps optimistically—that the RVNAF was flying combat in their B-57 aircraft. One observer who was there said that there never was a fixed complement of B-57s assigned to the RVNAF. Whatever aircraft were not busy that day had their insignia overpainted and called the RVNAF.

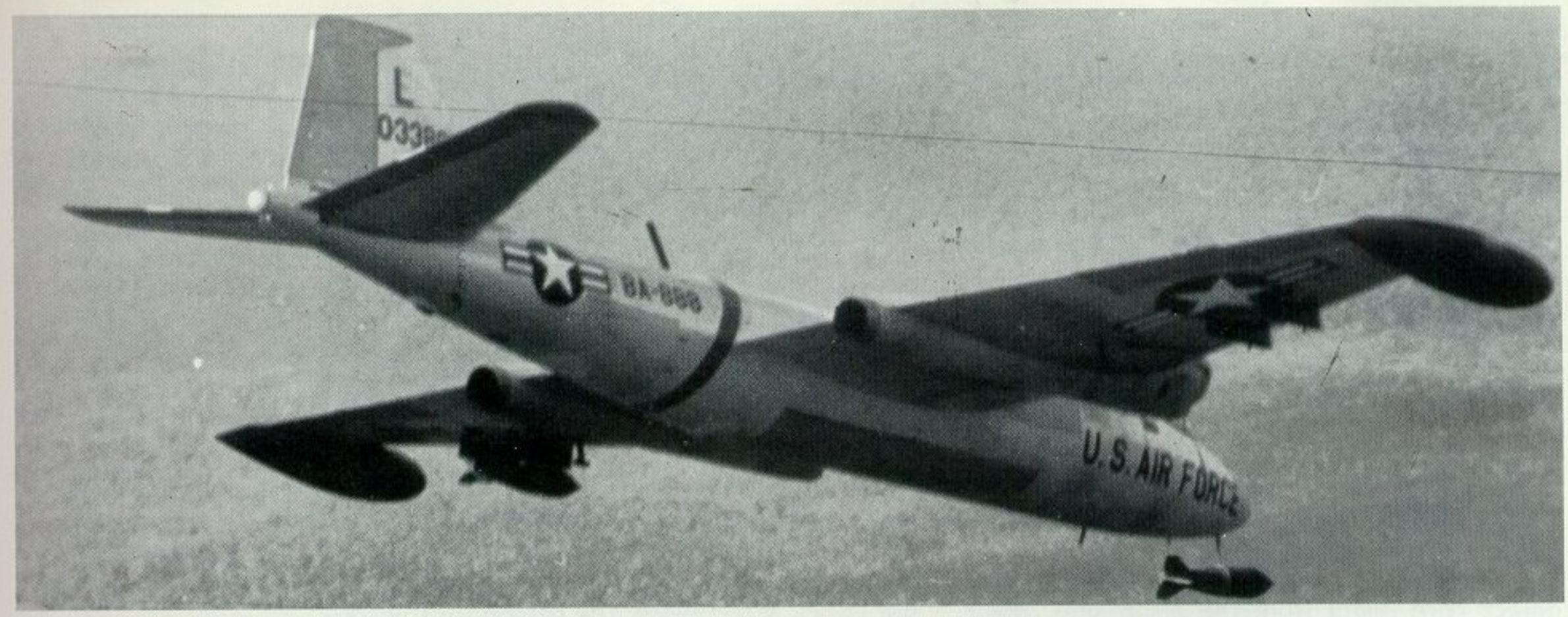
Whoever made the count in August 1966 saw six aircraft marked with RVNAF insignia, and it was duly reported that the strength of the RVNAF had been increased substantially.

Both 1966 and 1967 were quiet years, as far as any notice being taken of B-57 operations. They were not quiet years for the crews, but war never is. The B-57s soldiered on, making their strikes against selected targets day after day, and exhibiting the staying power of the aircraft.

Finally, in September 1970 the 13th Bomb Squadron (Tactical) arrived at Ubon Air Base, in Thailand, with the B-57G, ready for night interdiction missions. These G models, crammed with special radars, infra-red detection systems, laser rangefinders, cannon, rockets and laser-guided bombs, were sent against targets on the Ho Chi Minh Trail. Aircraft worth several millions of dollars, plus two invaluable crewmen, were flying against individual targets worth only a few hundred or thousand dollars. Clearly the game was not worth the candle, and the B-57Gs were pulled out of action after less than two years, and returned to the USA where they are flying above the level plains of Kansas with the 190th TRG, Kansas Air National Guard.

Being sent to Kansas is a fairly hard end for an expensive combat aircraft, but it is better perhaps than going to the 'boneyard', the USAF term for MASDC. It's a misleading term; aircraft are, in fact, scrapped there, but more often the storage area serves as a gigantic spare-parts warehouse that keeps the aircraft flying long after the company that built them has stopped making parts.

In the late spring of 1972, 40 B-57s of different models were in storage at MASDC. A few were scheduled to be scrapped, but by far the larger number waits for re-activation, perhaps even



B-57B (53–3888) of the 13th Bomb Squadron, 3rd Bomb Wing, unloads a pylon against a target in the highlands of Central Viet Nam in February 1965. Diagonal red stripe on fuselage identifies 13th Bomb Sq., with yellow the band colour for the 8th Bomb Sq., 3rd Bomb Wing. The two squadrons did alternate combat tours in Viet Nam following the Tonkin Gulf incident. Units were based at Clark Air Base in the Philippines and rotated to Viet Nam.
(Photo: USAF 94507)

back to tactical uses. Eight B-57Bs, for example, were taken out of storage in mid-1972 to be replacements for ADC's EB-57A ECM aircraft. They presumably will be re-equipped as EB-57B models and assigned to defense systems evaluation missions.

DSES Operations

Two Defence Systems Evaluation Squadrons (DSES) are the 'enemy' to US air defences. Simulating an enemy bomber force, the specially-modified EB-57s strike without warning, day or night, at low level or high altitude, trying to get past the defence systems.

The aircraft are assigned to the 4677th DSES, at Hill AFB, Utah, and the 4713th DSES, at Otis AFB, Mass., units of the Aerospace Defence Command (ADC). B-57s modified to do this mission bristle with antennas protruding from their bellies. Their bomb-bays are filled with the latest electronic countermeasures and warfare systems to confuse the defence.

Typically, a DSES force—one B-57 to several types—flies to a remote staging base in Canada, Bermuda, or the US and waits to attack. Crews get last-minute weather briefings and takeoff to strike. They fly clear of the known Air Defence Identification Zones (ADIZ) and to their assigned mission penetration points.

On the attack, the second crewman—an electronics warfare officer (EWO)—drops chaff to begin the confusion. As soon as the crew detects defence action against them, the EWO brings out the full panoply of countermeasures. He jams, sends spurious intercept information, discharges more chaff, and tries to confuse the defence forces. Pre-arranged signals end the encounter.

Reconnaissance Missions

A more dangerous game than playing enemy is the game of high-altitude reconnaissance, the kind of job that led to the requirements for the RB-57D and the RB-57F. These operations are highly classified, and very little information is available.

Two RB-57Ds were reported to have been operating out of Formosa some years back, marked with the insignia of the Nationalist Chinese Air Force. The mainland Chinese made a loud outcry about the overflights, specifically identifying the RB-57D as the culprit. The US made no comments at the time, or later.

Other reports said that the Pakistan Air Force was operating one or more RB-57F aircraft. It is likely that the aircraft were marked with Pakistani insignia, but that the crews flying them were USAF.

A detachment of WB-57F aircraft currently is stationed at Yokota Air Base, Japan, operating as part of the 9th Weather Reconnaissance Wing. And detached DSES aircraft occasionally are seen on duty in Europe, where they can be used not only to simulate attacking forces, but to annoy enemy defenders of air space in the continuing battle of electronic wits over the borders.

Hurricane-Hunting and Other Jobs

Certainly the oldest B-57 now flying is B-57A 52–1419, the second production aircraft. Now registered N1005, the aircraft is operated by the Research Flight Facility of the National Oceanographic and Atmospheric Administration (NOAA). Based at Miami International Airport, Florida, along with several other NOAA aircraft, it has been flying with the unit since January 1960 when it was transferred from USAF.

N1005 is used for chasing and seeding hurricanes, for investigating high-altitude weather phenomena, and for specific studies in clear-air turbulence (CAT). CAT is also a concern of NASA and the Dept. of Transportation. They jointly operate a B-57B (52–1576) registered NASA 809 out of the NASA Flight Research Center, Edwards, Calif. The B-57B is flown in areas of potential CAT, and flies a 30-minute recording pattern when it encounters any.

This NASA aircraft also is being used for drop

The first RB-57D, serial 53–3977, was accepted by the USAF in November 1955. Assigned to Strategic Air Command for day photo reconnaissance, the aircraft was one of a batch of six designed for the job. Note the break in the belly contour under the cockpit, where cameras were mounted. This aircraft later served with the Air Weather Service and then was converted to an EB-57D and assigned to ADC for defence systems evaluation, where it was based at Hill AFB, Utah. It was in storage at MASDC in May 1972.
(Photo: Martin Co.)

tests of the Viking parachute decelerator that will be used to soft-land an experimental package on Mars in 1976.

An RB-57F and other aircraft were used to detect corn blight from the air in 1971. The F photographed more than 45,000 sq. miles during the corn-growing season, recording on colour infra-red film the spread and extent of the plant disease.

Two WB-57F have now been loaned by USAF to NASA's Manned Spacecraft Center, at Houston, Texas, to operate in support of the Earth Resources Technology Satellite (ERTS). The support programme is intended to establish base-line data to which later satellite photos will be compared. Flying at altitudes of about 60,000 ft., the WB-57Fs have been used to obtain 'leaves-off' and 'leaves-on' photos in portions of both the visible and invisible spectrum.

Weather Reconnaissance

Aircraft of the 58th WRS, Kirtland AFB, have supported many such experiments for agencies of the government. But, flying WB-57Fs, their primary task still is weather reconnaissance and, in the official statement of their mission, '. . . the Air Weather Service provides or arranges . . . airborne atmospheric sampling (gathering particulate or whole air samples of the atmosphere) and reconnaissance operations for the Department of Defence and other Federal agencies . . .'

Weather reconnaissance missions last up to seven hours, and both crew members are confined in their pressure suits for that entire time. This suit, which can maintain a 35,000-ft. internal pressure level up to ambient altitudes of 75,000 ft., is a $12,000 garment that has to be fitted carefully, and tended lovingly. Each crew member has two suits available.

The crews are all volunteers; they train at the 4756th Psychological Training Unit, Tyndall AFB, Florida, in an altitude chamber that takes them to 75,000 ft. in simulated flights.

Routine flights in the WB-57F are made above 60,000 ft., and specialized crew training is very necessary. Each flight is preceded by a complete medical exam for both crew members and the back-up crew. A special meal follows, featuring high protein and low residue. The crews then dress, checking their pressure suits once before getting into the aircraft and once again after they are seated inside. The back-up crew has given the aircraft its pre-flight inspection, so that the prime pilot starts the engines as soon as the suit check is complete. The reason for this routine is that the suits get very uncomfortable on the ground; they are inefficient before the airplane is airborne. Taxi and takeoff clearances get priority.

The second crew member is the navigator on weather flights. Primary navigation is done by dead-reckoning and celestial navigation means, using the Baird-Atomic system and a dead-reckoning kit made up before the flight. The navigator carries at least two of these, because if he drops one, he can't bend over to locate it in the cockpit.

Even though the WB-57F carries Doppler radar, VOR, Tacan and ADF equipment, most of the flights are in remote areas over the Poles where radio navigation is highly marginal. The Doppler does give ground speed and drift with good accuracy to aid the dead-reckoning calculations. But winds above 60,000 ft. are completely unpredictable, change quickly and can blow as fast as 100 kt. or more.

External Markings and Colours

Early B-57 models were finished in the gloss black paint standardized for the night intruder mission. Markings and codes were in gloss red. Some of the B-57B models in service with USAFE carried distinctive markings on their vertical tails, but this practice was not widespread.

Aircraft assigned to the Air National Guard were stripped to bare metal and operated that way. The markings varied from state to state, both in size and location. The closest approach to standardization was the use of a 24-in. diameter ANG decal insignia on the vertical tail.

Most B-57 types not in a theatre of war retained the bare metal finish. Some of the RB-57D aircraft sported the white upper surface and black belly combination in the late 1950s.

B-57s operating in South Viet Nam at first were unpainted and carried only their standard codes and markings. Later they were all camouflaged in the standard three-tone arrangement called for in TO 1–1–4: Under surfaces in FS 36622 grey, upper surfaces in FS 30219 tan, FS 34079 dark

green and FS 34102 green. Pacific Air Forces was granted special authority to use FS 17038 black as an under-surface colour in special cases. Some B-57s did use that scheme.

Jettisonable wing or pylon tanks were specified with grey or black bottoms, with 34079 green tops.

Tow-target and DSES aircraft carried large areas of Dayglo paint markings on their nose and vertical tails. All tip tanks on these two classes of B-57s were also painted with Dayglo red (FS 38905) or orange (FS 38903).

Aircraft assigned to the Air Force Missile Test Center were refinished with aluminium lacquer to protect them from the salt spray.

B-57 Valedictory

The Night Intruder carries on, out of combat now, but still playing the deadly game of war. Its crews still probe defences here and abroad, still monitor the upper atmosphere, still photograph and record the earth from 70,000 ft.

Perhaps a hundred of the fleet remain, with half that number in service.

Twenty years is old for an airplane, and the B-57 is approaching that mark. Newer aircraft have taken over some of its missions. War finally is becoming unpopular. Military budgets are feeling the pinch of inflation and the escalating costs of new technology.

But don't write off the B-57 quite yet. It has been a versatile performer, coping readily with the jobs for which it was designed, and equally readily with missions unimagined at its birth.

It may well turn out to be the 'gooney bird of the jet fleet'.

TABLE I: B-57 SPECIFICATIONS (ALL MODELS UNLESS NOTED)

Dimensions: Span, 64.0 ft.; 106.0 ft. (D); 122.5 ft. (F); overall length, 65.5 ft.; 64.8 ft. (D); 68.3 ft. (F); 68 ft. estimated (G); height, three-point 15.5 ft.; 14.8 ft. (D); 20.5 ft. (F).

Weights: Empty, 24,290 lb. (A); 27,091 lb. (B&C); 27,275 lb. (D); 34,099 lb. (E); 36,876 lb. (F); combat mission, 35,750 lb. (A); 38,689 lb. (B&C); 35,335 lb. (D); 37,300 lb. (E); 49,500 lb. (F); maximum take-off, 51,547 lb. (A); 56,965 lb. (B&C); 45,507 lb. (D); 54,072 lb. (E); 61,500 lb. (F).

Powerplant and maximum rated thrust: 2 × J65-W-5 at 7,220 lb. each; 2 × J57-P-27 at 10,500 lb. each (D); 2 × TF33-P-11A at 16,500 lb. each plus 2 × J60-P-9 auxiliaries at 2,900 lb. each (F).

Fuel system capacity (US gallons): Internal, 2,252 gal.; 2,740 gal. (D); 3,870 gal. (F); external, 640 gal. in wingtip drop tanks (A, B, C, E & G).

Communication equipment: ARC-27 or -34 UHF command set; AIC-10 interphone; AIC-18 interphone (F); APX-6 or -25 IFF radar; VHF-101 VHF command set (F); 618T-3 HF command set (F).

Bombing/navigation equipment: ARN-12 marker beacon; ARN-6 radio compass and ARA-19 remote tuning group; S-2A or S-4 Shoran; ARN-21 Tacan; APW-11A radar beacon and APA-90 indicator group; APN-69 radar beacon (D); ARN-14 omni-range receiver; ASN-6 navigation computer; ARN-18 ILS receiver; M-1 toss bomb computer; MA-1 fire control system; MA-2 LABS (Low-Altitude Bombing System).

Bombing/navigation equipment installed in modification programmes: APG-31 ranging radar; APN-22 radio altimeter; APN-59 navigation radar; ARD-9A detection and homing device; APS-60 search radar; ARA-25 UHF direction-finder; APN-69 rendezvous equipment; ARN-30 navigation receiver.

Navigation equipment on WB-57F: VOR-101B VOR/ILS system; APN-102 Doppler radar; ARA-25 UHF direction finder; ID-663/U bearing distance heading indicator; ID-387 course indicator; 51Z-2 marker beacon; C-12 gyro compass; ARU-4A attitude indicator; Lear-Siegler MC-1 autopilot; Baird-Atomic 511F sextant and viewer.

Electronic countermeasures or reconnaissance equipment: ALE-2 or -6 chaff dispensers; ARA-3 modulator; APR-9 radar receiver; APG-30 tail-warning radar, later replaced by APS-54 tail-warning equipment; ALT-6 jamming transmitter; ANH-2 wire recorder (D); APA-54 reconnaissance recorder; APR-14 panoramic reconnaissance radar receiver; ALQ-71 and -72 noise jammer transmitters. Much other classified and unidentifiable equipment.

TABLE II: MARTIN B-57 CONTRACT SUMMARY

Model	Serial Numbers	Quantity
Contract AF33(038)–22617		
B-57A	51–17352 (was B.2 WD940)	1
	51–17387 (was B.2 WD932)	1
	52–1418 through 52–1425	8
RB-57A	52–1426 through 52–1492	67
B-57B	52–1493 through 52–1594	102
Contract AF33(600)–22208		
B-57C	53–3825 through 53–3858	34
B-57B	53–3859 through 53–3935	77
B-57C	53–3936	1
B-57B	53-3937 through 53-3939	3
B-57C	53–3940	1
B-57B	53–3941 through 53–3943	3
B-57C	53–3944	1
B-57B	53–3945 through 53–3947	3
B-57C	53–3948	1
B-57B	53–3949 through 53–3962	14
Contract AF33(600)–25825		
RB-57D	53–3963 through 53–3976	14
	53–3977 through 53–3982	6
Contract AF33(600)–29645		
B-57E	55–4243 through 55–4301	68

TABLE III: B-57 MISSION PERFORMANCE

Item	B-57A	EB-57A	B-57B	B-57C	RB-57D	EB-57D	B-57E	RB-57F
Take-off weight, lb.	51,547	48,600	53,721	53,721	45,085	46,000	54,072	63,000
Weapons payload, lb.	5,460	None	5,260	5,260	None	None	4 trgt	None
Fuel load, lb.	19,318	18,798	18,798	18,798	17,810	16,800	18,798	23,000
Take-off distance, ft.	4,315	3,860	5,000	5,000	2,300	2,000	5,050	2,600
SL rate of climb, ft./min.	4,340	4,000	4,320	4,320	6,700	—	3,825	2,725
Service ceiling, ft.	40,500	40,500	40,100	40,100	55,000[1]	—	28,600	60,800
Combat radius, naut. mi	662	725	514	514	1,354	—	—	1,280
Av. cruise speed, kt.	423	390	417	417	413	—	—	411
Speed at target, kt.	434	390	500	500	413	—	371	411
Altitude at target, ft.	SL	37,000	SL	SL	59,700	—	35,000[1]	63,200
Landing weight, lb.	27,726	32,302	31,528	31,528	29,056	—	38,287	42,587
Ground roll, ft.	1,192	2,425	2,350	2,350	1,500	—	2,875	2,800
Total mission time, hr.	4.2	3.8	3.5	3.5	6.6	—	2.7	6.1

Notes: [1] =Estimated; all other data from official USAF sources, based on design mission parameters. Actual aircraft performance will vary from these numbers depending on mission loadings, aircraft configuration and condition.

TABLE IV: GENERAL DYNAMICS RB-57F CONTRACT SUMMARY

Serial	Rebuild of	Status, August 1 1972
63–13286	B/B 52–1599	In storage, MASDC
63–13287	B/B 53–3864	Lost
63–13288	B/B 52–1539	58 WRS, Kirtland AFB, NM
63–13289	B/B 52–1527	In storage, MASDC
63–13290	B/B 52–1562	58 WRS, Kirtland AFB, NM
63–13291	B/B 52–1574	58 WRS, Kirtland AFB, NM
63–13292	B/B 52–1594	58 WRS, Kirtland AFB, NM
63–13293	B/B 52–1583	In storage, MASDC
63–13294	B/B 53–3935	58 WRS, Kirtland AFB, NM
63–13295	B/B 53–3918	58 WRS, Kirtland AFB, NM
63–13296	B/B 53–3897	58 WRS, Kirtland AFB, NM
63–13297	B/B 53–3900	Lost
63–13298	B/B 52–1536	58 WRS, Kirtland AFB, NM
63–13299	B/B 52–1573	58 WRS, Kirtland AFB
63–13300	RB/A 52–1427	Det 3, 9 WRW, Yokota AB, Japan
63–13301	RB/A 52–1432	Det 3, 9 WRW, Yokota AB, Japan
63–13302	RB/A 52–1433	Det 3, 9 WRW, Yokota AB, Japan
63–13500	RB/D 53–3972	58 WRS, Kirtland AFB, NM
63–13501	RB/D 53–3975	NASA 925 at MSC/Houston
63–13502	RB/D 53–3970	58 WRS, Kirtland AFB, NM
63–13503	RB/D 53–3974	NASA 926 at MSC/Houston

TABLE V: MARTIN B-57G SERIALS

Martin B-57G aircraft all were rebuilt from B-57B models and carried the same serial numbers before and after the rebuild. The 16 aircraft in the programme were:

52–1578	53–3886
52–1580	53–3889
52–1582	53–3898
52–1588	53–3905
53–3860	53–3906
53–3865	53–3928
53–3877	53–3929
53–3878	53–3931

TABLE VI: MAP AIRCRAFT

In late 1959, Pakistan received a number of B-57 aircraft under the US Military Assistance Program (MAP). The following list of serial numbers is believed to be complete.

B-57B	53–3885	B-57B	53–3951
	53–3891		53–3952
	53–3938		53–3954
	53–3941		53–3955
	53–3942		53–3956
	53–3943		53–3957
	53–3945		53–3958
	53–3946		53–3959
	53–3947		53–3960
	53–3949		53–3961
	53–3950	B-57C	53–3846

Additionally, a B-57B (53–3939) was in the MAP listing at that time, on loan to Autonetics Corp., and based at Palmdale, Calif.

TABLE VII: PRODUCTION CHRONOLOGY, FIRST B-57A

1951:	
January:	First meeting between Martin and English Electric, Company.
February:	Initial licence discussions with US Air Force.
February 24:	First B.2 Canberra pattern aircraft arrived at Martin.
March:	Letter contract for 250 aircraft plus one static article.
May:	First engineering data received from English Electric; licence agreement signed, first payment made to EEC.
July:	First details released to shop for fabrication.
August:	USAF approval of Hudson & Kaiser subcontracts.
1952:	
August:	First centre-section completed by Martin.
September:	First nose section completed by Martin.
December:	First aft section received from Hudson.
1953:	
February:	First J65 engine received from Buick for test; first wing received from Kaiser for static test.
June:	Final assembly completed.
July 20:	First flight, first B-57A.

TABLE VIII: B-57 ALLOCATIONS

The following operational units are known to have used one or more models of the Martin B-57:

1st Tactical Fighter Wing:
4424th Combat Crew Training Squadron

3rd Bomb Wing:
8th, 13th and 90th Tactical Bomb Squadrons

10th Tactical Reconnaissance Group:
1st, 32nd, 38th and 42nd Tactical Reconnaissance Squadrons

13th Reconnaissance W

17th Bomb Group:
34th, 37th, 73rd and 95th Bomb Squadrons (Tactical)

26th Tactical Reconnaissance Wing

33rd Tactical Group:
Detachment 1

35th Tactical Fighter Wing

38th Bomb Wing:
71st, 405th and 822nd Bomb Squadrons

66th Tactical Reconnaissance Group:
30th, 362nd and 303rd Tactical Reconnaissance Squadrons

345th Bomb Group (Tactical):
498th, 499th, 500th and 501st Bomb Squadrons (Tactical)

363rd Tactical Reconnaissance Wing:
9th, 17th, 160th and 161st Tactical Reconnaissance Squadrons
4416th Technical Evaluation Squadron

405th Fighter Wing

460th Tactical Reconnaissance Wing:
Detachment 1

461st Bomb Group (Tactical):
764th, 765th and 766th Bomb Squadrons (Tactical)

Air National Guard:
110th Tactical Reconnaissance Group, Michigan
123rd Tactical Reconnaissance Group, Kentucky
189th Tactical Reconnaissance Group, Arkansas
190th Tactical Reconnaissance Group, Kansas
Unidentified units, Nevada

Air Weather Service:
55th, 56th and 58th Weather Reconnaissance Squadrons
9th Weather Reconnaissance Wing: Det. 3

Miscellaneous units:
17th Tow Target Squadron
21st Operations Squadron
317th Fighter Interceptor Squadron
556th Reconnaissance Squadron
4677th Defense Systems Evaluation Squadron
4713th Defense Systems Evaluation Squadron
4758th Defense Systems Evaluation Squadron
6250th Combat Support Group: Det. 1
6550th Operations Squadron
7406th Combat Support Squadron
7407th Combat Support Squadron

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